DESCRIPTIVE CATALOGUE.

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DESCRIPTIVE CATALOGUE

OF THE

PREPARATIONS

IN

THE MUSEUM,

OF THE

Royal College of Surgeons in Ireland.

By JOHN HOUSTON, M.D. M.R.I.A.
CURATOR OF THE MUSEUM,
ETC. ETC.

VOL. I.

(ANATOMY).

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APPENDIX.

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* NOTE.—Some very trifling differences will be found to exist between the classification here given, and that in the *Regne Animal* of Cuvier. The classification adopted by Cuvier in the Leçons d'Anatomie Comparee was that mainly followed in the first attempts at arrangement of the Museum, and it has been since found impossible so far to deviate from the first plan as to assimilate it completely to the changes which he introduced in his later works.——J. H.

The Royal College of Surgeons, as a body, do not hold themselves responsible for the matter or style of this Catalogue. It has been executed altogether by the Curator of the Museum, in compliance with the wishes of the College.

INTRODUCTION.

In furtherance of a recent regulation of the Royal College of Surgeons in Ireland, by which the museum and library have been opened to students in medicine, instructions have been issued, "that the catalogue of the preparations in the museum be forthwith printed," to render the collection the more completely available for instruction.

The arrangement of the anatomical department being already perfected, whilst that of the preparations in pathology yet remains unfinished, owing to the want of sufficient accommodation for the numerous specimens lately added, a necessity has arisen of dividing the catalogue into two volumes—the first, the present one, to contain a description of the preparations illustrating the structure of animal bodies in their normal state—the second, to embrace a description of the same structures when altered by disease, and to be printed as soon as the contemplated extension of the museum shall have been so far perfected as to allow of the completion of the arrangement.

Before entering into details, it will be proper to give some explanation of the kind of classification adopted, and of the mode by which reference may be made from the preparations on the shelves to the catalogue, or vice versa, from the catalogue to the exact spot in the museum at which the prepa-

rations are to be found. Much of the value of such collections depends upon the facility with which these two objects are attainable, and to simplify them, for the benefit of those who may hereafter study in the museum, considerable pains have been bestowed.

In a museum, the several sections of which, are so far completed as to require few or no farther additions, little difficulty on this head would be experienced: the ordinary mode of arrangement by numbers, from units consecutively to thousands, would serve every purpose; but in a collection, each and every section of which is continually on the increase, and in which the numerous additions are to be received into their respective places on the shelves, and arranged under their appropriate letters and numbers of reference in the catalogue, without any violation of order in either the one or the other, such mode is evidently inapplicable.

The insufficiency of this as well as of several other systems proposed to render the same catalogue suitable to the museum in the advanced as well as in the early state, to preserve the appliancy of the one to the other, under any circumstances of increase or diminution, has led the present curator of the museum at Dublin, to the adoption of a somewhat new plan. Let not the student, however, turn away from the subject on account of the term "new plan"—let him not be deterred from studying the museum under the apprehension of being obliged to wade through a newly devised classification in anatomy or zoology. The novelty spoken of is not of so serious a character; it is solely confined to the labeling of the preparations, and placing them so as to facilitate and encourage approach to them.

In the anatomical department, all the preparations are arranged in eight classes, which are severally distinguished both

in the catalogue and on the presses by letters of the alphabet in roman characters.

The first class, distinguished by the letter A, contains all the organs concerned in the assimilation of food.

The second by B, contains the organs of circulation.

The third by C, the organs of respiration.

The fourth by D, the organs of sense.

The fifth by E, the organs of loco-motion and prehension.

The sixth by F, the organs of generation and secretion of urine.

The seventh by G, monsters of all kinds; and

The eighth by H, contains specimens in natural history, illustrative of some peculiarities of organization.

These classes are again sub-divided into orders, the numbers of which vary with the most convenient subdivisions which each admits of, and are distinguished by letters in italics. Thus the first class embracing all the series of organs concerned in the assimilation of the food, and distinguished by the roman letter A, admits conveniently of subdivision into four orders.

In the first marked *a*, are contained those parts of the alimentary system, which, in the form of preparations, can be most conveniently grouped and exhibited together, viz. the mouth, tongue, pharynx, and œsophagus.

The second order *b*, contains preparations of the stomach.

The third *c*, those of the intestines.

The fourth *d*, the glands connected with the intestines.

The same mode of subdivision into orders, and of marking by appropriate letters in italics, is observed throughout the other classes. (See table. p. 9.) The preparations of human and comparative anatomy are placed side by side throughout the museum, and are arranged in the several orders to accord with the classification of Cuvier, as adopted in his Leçons

d'anatomie compareè. Those of man, are placed first in the scale ; next, those of the quadrumana, which are followed in order by preparations of the carnivora, rodentia, &c. down to the lowest tribe of animated beings, the zoophytes.

To a student, therefore, wishing to avail himself of the information to be gleaned from the study of this collection, it will be necessary, beforehand, to make himself acquainted with the mode of classification on which the arrangement is based ; and to facilitate this object for him, an abstract of the classification spoken of is subjoined at page 10-11.

The application of figures to assist in the arrangement is managed thus. Each of the eight classes is furnished with a distinct series of numbers, which run continuously throughout its several orders ; and on purpose to receive the additions which may from time to time be made, blank spaces are left, opposite many of the figures in the index of the manuscript catalogue, averaging the number which may be required to complete each series.

The same letters which distinguish the class and order of each object in the catalogue, with the figures betokening its number, being also marked on the most conspicuous part of the preparation, the latter can be readily discovered on the shelf—and the preparations being themselves moveable, they can be shifted from place to place, to make way for future additions, with a preservation of due correspondence throughout between the catalogue and museum.

The book is divided into two equally essential parts—the index placed at the end, and the descriptive part. The index contains a brief list of all the preparations in the museum, and demonstrates as nearly as possible the order of their arrangement on the shelves ; it also indicates the page in the descriptive division of the work, at which any further notice taken of particular objects may be discovered.

The addition of cards to the shelves, bearing the mark and number and giving a concise account of each preparation, is made for the twofold purpose of affording information to the passing visitor, and of facilitating the replacement of preparations after their removal for exhibition at lecture.

This plan of subdivision into classes and orders, is no doubt altogether arbitrary, and may sometimes appear unnatural, as in the case of the 6th class, where the organs of generation and secretion of urine are placed together; but it must be remembered, that preparations in a museum, do not admit, without unnecessary duplicates, of the same facility of arrangement as the objects embraced in the syllabus of a course of lectures, or in the index to a book on the same subject: parts closely joined to each other, though not accessary to the same function, are often best exhibited together: thus in the case before us, the close anatomical connection which exists between the genital and urinary organs, renders it much more convenient and instructive to exhibit them in the same preparation, than separately, and consequently more proper, when the chief object is facility of reference, to arrange them under the same class and order.

When an entire animal is preserved in one preparation, and prepared so as to exhibit many organs, an entry is made of each severally in their respective places in the index, with a reference therefrom to a more full description of the whole, which is given under some prominent character of the preparation. Without this precaution the catalogue would fail in conducting the student to several interesting objects in the museum, and without it, too, an examination of the collection itself would be insufficient to the discovery of all the information which it contains, illustrative of the structure and functions of animal bodies.

The pathological department has been formed by dona-

tions from the members and licentiates of the college, and from several other professional gentlemen, who have politely contributed to its advancement. When first established, many valuable specimens in anatomy and pathology were added by the late professor Todd; and within the past year the number has been enlarged by the munificent donation, from professor Kirby, of his entire museum, containing upwards of five hundred specimens.

In order to distinguish the labours of the several gentlemen who may have filled the office of curator, it is allowed by the college, that the names of each shall be added to their respective preparations. As yet, the initials of but two names appear on the labels, those of the present Curator, and those of his talented and enlightened predecessor, the late Mr. John Shekleton, by whose great exertions, even to the sacrifice of his life, the collection was first founded; and of whom a bust has been placed in the museum, in testimony of the high sense entertained by the college of his services, and their regret at the premature termination of his distinguished career.

January 1*st*, 1834.

TABULAR VIEW OF THE ARRANGEMENT OF THE PREPARATIONS,

WITH THE LETTERS DISTINGUISHING THE CLASSES AND ORDERS.

	CLASS.	ORDER.	
A	Organs of Assimilation.	A. *a.*	Mouth, tongue, œsophagus, pharynx.
		A. *b.*	Stomach.
		A. *c.*	Intestines.
		A. *d.*	Glands concerned in digestion.
B	Organs of Circulation.	B. *a.*	Lymphatics, lacteals, and their glands.
		B. *b.*	Heart and pericardium.
		B. *c.*	Arteries and veins.
		B. *d.*	Blood, lymph, sap, jelly, cartilage, cellular membrane, &c.
C	Organs of Respiration.	C. *a.*	Trachea, larynx.
		C. *b.*	Lungs, branchiæ, spiracula.
D	Organs of Sense.	D. *a.*	Brain, nerves, ganglia.
		D. *b.*	Organ of sight.
		D. *c.*	Organ of hearing.
		D. *d.*	Organ of smell.
		D. *e.*	Tegumentary membranes.
E	Organs of Loco-motion and Prehension.	E. *a.*	Skeleton.
		E. *b.*	Joint, ligament, muscle, formation and growth of bone.
		E. *c.*	Formation and growth of teeth.
F	Urinary and Genital organs.	F. *a.*	Kidney, bladder.
		F. *b.*	Male: penis, prostate, vesiculæ, testicles, &c.
		F. *c.*	Female: womb, mammæ, fœtus and membranes, &c.
G	Monsters.	G. *a.*	Monsters of all kinds.
H	Animals.	H. *a.*	Mammalia.
		H. *b.*	Birds.
		H. *c.*	Reptiles.
		H. *d.*	Fishes.
		H. *e.*	Mollusca.
		H. *f.*	Articulata.
		H. *g.*	Radiata.

ABSTRACT OF CUVIER'S CLASSIFICATION OF ANIMALS,

REFERRED TO AT PAGE 5.

Four Great Divisions.

1. Vertebrata.
2. Mollusca.
3. Articulata.
4. Radiata.

VERTEBRATA.

Characters.—Internal skeleton—brain and spinal marrow in separate cavities—red blood and muscular heart—mouth with two horizontal jaws—five organs of sense—never more than four limbs—separate sexes.

MOLLUSCA.

Ch.—No skeleton—muscles all attached to external skin—nervous system situated in the visceral cavity and composed of separate masses joined by nervous filaments—taste, sight, or, as in one instance, hearing, the only senses,—organs of circulation, respiration, and digestion very perfect.

ARTICULATA.

Ch.—No skeleton—two long nervous chords with ganglia at intervals—have usually taste and sight—divided into jointed rings, soft or hard, to inside of which muscles attached—sometimes lateral limbs, sometimes none—jaws when present always lateral.

RADIATA.

Ch.—Organs of movement and sense disposed circularly around a centre, not symmetrically as in the preceding—no visible nerves—no organs of sense or circulation—respiration performed by the outward integument—intestines often a simple bag—sometimes the animal is but a homogeneous pulp without aperture or cavity.

VERTEBRATA.

Class 1. Mammalia.

Order 1. Bimanum	....	....*Examples,*		Man.
2. Quadrumana	....	....	——	Ape, Maki.
3. Sarcophaga	....	....	——	Dog, kanguroo, hedgehog, batt.
4. Rodentia	....	....	——	Hare, squirrel, rat, marmot.
5. Edentata	....	....	——	Ant-eater, armadillo, sloth, ornithorynchus.
6. Pachydermata		....	——	Elephant, hog, rhinoceros, horse.
7. Ruminantia	....	....	——	Camel, ox, sheep.
8. Amphibia	....	....	——	Seal, walrus.
9. Cetacea	....	....	——	Dolphin, whale.

Cl. 2. Aves.

Ord. 1.	Accipitres	....	*Exam.*	Eagle, hawk, owl, buzzard.
2.	Passeres	....	——	Thrush, crow, sparrow, humming-bird.
3.	Scansores	....	——	Woodpecker, toucan, parrott, cuckoo.
4.	Gallinæ	....	——	Pigeon, turkey, ostrich.
5.	Grallæ	....	——	Heron, spoonbill, woodcock.
6.	Anseres	....	——	Duck, pelican, diver, cormorant.

Cl. 3. Reptilia.

Ord. 1.	Chelonia	....	*Exam.*	Turtle, tortoise.
2.	Sauria	....	——	Crocodyle, lizard.
3.	Ophidia	....	——	Viper, boa-constrictor.
4.	Batrachia	....	——	Frog, toad, salamander.

Cl. 4. Pisces.

Skeleton cartilaginous.	*Ord.* 1.	Chondropterigii	*Exam.*	Lamprey, ray, dog-fish.
	2.	Branchiostegii	——	Sturgeon, frog-fish.
	3.	Apodes	——	Eel, gymnotus electricus.
Skeleton osseous.	4.	Jugulares	——	Cod, haddock, whiting.
	5.	Thoracici....	——	Perch, hollybut, turbot.
	6.	Abdominales	——	Salmon, herring, pike.

MOLLUSCA.

Head crowned with tentacula which serve as feet.	*Cl.* 1.	Cephalopoda	*Exam.*	Cuttlefish, nautilus.
Progression by fins placed near the head.	2.	Pteropoda	——	Clio-borealis.
Head free, progression on the belly.	3.	Gasteropoda	——	Snail, chiton, whelk.
Without distinct head.	4.	Acephala	——	Oyster, muscle, teredo.
Two long arms at the mouth for seizing objects.	5.	Brachiopoda	——	Lingula anatina, *the only known specimen.*
Arms very numerous, articulated, horny.	6.	Cirrhopoda	——	Lepas anatifera, triton.

ARTICULATA.

Class 1.	Annelides	..	*Exam.*	Leech, sea-mouse, earthworm.
2.	Crustacea	..	——	Crab, cyclops, shrimp, lobster.
3.	Aranea	..	——	Spider, tarantula.
4.	Insecta	..	——	Wood-louse, dragon-fly, ant, beetle, cricket, bug, butterfly, common fly, louse.

RADIATA *vel* Zoophyta.

Class 1.	Echinodermata	..	*Exam.*	Star-fish, sea-urchin.
2.	Entezoa { with intestines	..	——	Guinea worm, ascarides.
	Entezoa { without intestines	..	——	Tape worm, hydatid.
3.	Acalephæ	..	——	Actiniæ, medusæ.
4.	Polypa	..	——	Hydra, coral, alcyony, madrepore.
3.	Infusoria.	..	——	Wheel-animal, proteus.

DESCRIPTIVE CATALOGUE

OF

ANATOMICAL PREPARATIONS,

ETC.*

A. *a.* 1. A finely injected preparation, exhibiting the situation, form, and connections of the pharynx. The subject was that of a female, 13 years old: the posterior part of the head and the vertebral column have been removed, so as to expose the cavity from behind. The eustachian tubes, with prominent mouths marked by slips of whalebone, appear at the sides of the posterior nares: the isthmus faucium, soft palate, epiglottis, rima glottidis, and commencement of œsophagus, are all rendered evident. The injection has nearly restored the natural colour of the lips and tongue, and given prominence to the villi of the mucous membrane. Artificial eyes, which have been substituted for the original, give a striking expression of life to the countenance.—J. Shekleton.

A. *a.* 2. The tongue of an adult male, injected, and shown in connection with the sub-maxillary and sub-lingual glands. The orifices of the ducts of these glands at the sides of the frenum linguæ, and the relative situation of the whartonian duct and gustatory nerve are demonstrated.—J. Houston.

* In studying the catalogue and museum together, that part of the book to be first consulted is the Index, because, therein only are the preparations all registered and classed as on the shelves; and because from thence it is that references are made to the following illustrations of the leading objects in the collection.

A. *a.* 3. The tongue of an adult, injected from the right lingual artery: the redness produced by the injection is confined to the right side, and terminates by a defined line along the centre of the dorsal surface.—J. S.

A. *a.* 12. The tongue of a monkey: (*simia sabæa.*) this preparation, though uninjected, shows satisfactorily the nature of the villous structure of the tongue in this class of animals. The arrangement of the papillæ is like that on the human tongue: the conical papillæ are in greatest number, and scattered all over the surface; the fungi form are discoverable here and there among the latter; and the lenticular take a V shaped arrangement at the posterior part of the organ.—J.S.

A. *a.* 14. Integuments of the face of a monkey: (*simia flavescens.*) this preparation is designed to show the form of the nose, lips, mouth, &c. of the animal, and particularly the black colour of the mucous membrane lining the inside of the cheeks.—J. H.

A. *a.* 24. The tongue of a young lion: (*felis leo.*) the villi have not yet acquired the horny consistence, so marked in the old animal.—J. H.

A. *a.* 25. The tongue of a full grown lioness: the papillæ are horny, retroverted, and very abundant.—J. S.

A. *a.* 26. The tongue of a dog, showing the elastic ligament, vulgarly called the worm, which lies in the midst of the fleshy structure, and contributes to those rapid movements of the organ by which fluids are lapped into the mouth.—J. S.

A. *a.* 27. This preparation gives a collective view of the organs of deglutition in a dog. The mouth, tongue, and pharynx with the several passages leading into the latter cavity are all exhibited.—J. H.

A. *a.* 28. The tongue of a cat: (*felis catus.*) a good specimen of the form and structure of the organ in the smaller feline animals. It is long and pliable: the surface seems divided into three parts: the first, towards the tip, is studded over with horny retroverted villi, with an intermixture of fungiform papillæ: the second farther back, presents numerous soft villi with conical papillæ; and the third towards the root is covered with fine, soft, pendulous eminences, like those on the inside of the cheeks of herbivorous animals. See A. *a.* 89, 90.—J. S.

A. *a.* 29. The tongue, pharynx, and wind-pipe of a jackall; (*canis aureus.*) the tongue is long, moveable, and beautifully villous; the pharynx and œsophagus are muscular; and the trachea is so twisted on itself about the centre, that

the surface which, in the upper part of the neck, lies next the skin, in the lower is turned towards the spine.—J. H.

A. *a.* 30. 31. Number 30 shews the tongue of a bear full grown ; number 31 that of an animal of the same species, (*ursus americanus.* Pall.) about five months old, with the trachea attached. The difference in the condition of the villous surface of the organ at such different periods of life is strikingly illustrated.—J. H.

A. *a.* 33. The œsophagus of a wolf: (*canis lupus*) the muscular fibres pursue a spiral arrangement.—J. H.

A. *a.* 34. The tongue of a panther, (*felis pardus.*) injected : the papillæ towards the tip are horny and retroverted, and surrounded about their roots with numerous vascular villi : near the epiglottis the lenticular papillæ are arranged in the form of the letter V.—J. S.

A. *a.* 36. The pharynx and œsophagus of a fox : (*canis vulpes.*) the line of demarcation between them is marked by a circular projection of the mucous membrane.—J. H.

A. *a.* 37. The tongue, pharynx, œsophagus, larynx and trachea of a hedge-hog : (*erinaceus europeus.*) the tongue is broad, soft, and villous ; the epiglottis and rima glottidis stand considerably above the level of the margin of the soft palate ; the trachea is short.—J. H.

A. *a.* 50. The tongue of a porcupine : (*hystrix cristata.*) a deep fissure runs along the centre of the upper surface ; the cuticular covering is very thick ; numerous short horny eminences, arranged two by two, exist near the tip ; and the sentient villi are in greatest abundance about the centre.—J. S.

A. *a.* 51. The tongue of a rabbit : (*lepus cuniculus.*) a cartilaginous plate covered with mucous membrane appears near the back part, and anteriorly, numerous soft, fine villi are spread over the surface : the soft palate devoid of uvula terminates in a smooth concave border.—J. H.

A. *a.* 53. The lips and external nares of an agouti : (*mus agouti.*) the mucous membrane inside the lips and cheeks is lined with cuticle, and covered with fine hairs. The same peculiarity may also be seen in preparation 54, the mouth of a guinea pig.—J. H.

A. *a.* 64. The mouth of a platypus : (*ornithorynchus paradoxus.*) it consists of two parts unlike what are found in the head of any animal of the old continent : the anterior, broad and flat, and fringed along the margins with fine tranverse laminæ, resembles the bill of a duck ; the posterior, furnished in each jaw with flattened teeth like molares, is like the head of one of the mammiferæ.—J. S.

A. *a.* 80. The œsophagus of a hog : (*sus scropha.*) the muscular fibres take a spiral direction round the tube.—J. H.

A. *a.* 86. The tongue of a fœtal calf, (*bos taurus.*) with soft membranous villi, very unlike those of the full grown animal, which are sharp, horny, and retroverted.—J. H.

A. *a.* 88. The tongue of a rein-deer, (*cervus tarandus.*) about two months old, presented to the museum by the Surgeon General. The tongue is soft and villous ; the pharynx, and opening of the fauces very wide ; and the soft palate remarkably broad.—J. H.

A. *a.* 89. A piece of mucous membrane from the inside of the cheek of a nylgau, (*antil. picta* et *trago camelus.*) showing large, prominent, pendulous papillæ.—J. S.

A. *a.* 90. A piece of mucous membrane from the cheek of a dromedary : (*camelus dromedarius.*) numerous soft, flabby eminences hang from the inner surface.—J. H.

A. *a.* 91. The uvula from the palate of a dromedary. It is singularly soft as if ædematous, long, pendulous, and bifurcated at the lower extremity.—J. H.

A. *a.* 100. The tongue of a full-grown seal, (*phoca vitulina,*) short, thick, and fleshy, and covered at the dorsum with round flattened papillæ. See the preparation following.

A. *a.* 101. The tongue of a seal much younger than the preceding. The contrast between the organs, as to the degree of developement in the muscular and papillary structures is very striking—J. H.

A. *a.* 102. The œsophagus of a seal. (*ph. vitul.*) It is remarkably muscular, and the mucous membrane is smooth, strong, and covered with cuticle.—J. H.

A. *a.* 110. A portion of mucous membrane from the pharynx of a whale, (*delphinus diodon.*) showing large, deep, mucous follicles.—J. S.

A. *a.* 111. The tongue of a whale. (*delph. diod.*) It is short and thick, and nearly devoid of papillæ on the dorsal surface.—J. S.

A. *a.* 112. A preparation of a part of the gum of a whale, (*balæna rostrata.*) showing the vascular pulps from which the plates of whalebone are produced. The long, fine pulps seen floating like a fringe in the spirits, have been drawn out from the foramina in the roots of the whalebone into which they carry blood. Injection thrown into the arteries of the gums has in some places reached the finest extremities of the pulpy fringes. See 113, 114.—J. H. *Presented to the museum by Dr. Jacob.*

A. *a.* 113. The root end of a piece of whalebone, showing

the foramina for the transmission of the vascular pulps, by which its growth and nourishment are supported.—J. H.

Presented by Dr. Jacob.

A. *a.* 114. Some layers of whalebone sliced longitudinally, to show the hollow canals through which the nutritious pulps are conducted. See the two preceding preparations.—J. H.

Presented by Dr. Jacob.

A. *a.* 130. The tongue of an eagle. It is broad, flat, and rounded at the tip; grooved along the dorsum, and furnished with a horny coating, which is particularly unyielding under the apex: a number of strong papillæ are arranged across the base: the preparation shows also the cordæ vocales to be short and ligamentous.—J. S.

A. *a.* 135. The tongue and os-hyoïdes of a woodpecker. (*picus minor,*) The tongue is hard, pointed, and barbed: the cornua of the os-hyoides are so long and curved as to pass in a loose sheath round the occiput, and reach by their points the root of the upper mandibule: the genio-hyoidei muscles which arise from the chin, and follow these cornua to be inserted into their extremities, draw them during contraction back over the head, and in like proportion thrust forwards the tongue, which is a solid continuation of their structure. The power, which all the world knows the woodpecker to possess, of darting out its tongue with force and rapidity, is the result of this peculiar mechanism.—J. H.

A. *a.* 136. The tongue of a parrot. Although this creature possesses the power of uttering sounds and words like those articulated by man, no resemblance whatever can be traced between them in the construction of the tongue as an organ of speech. The tongue of the parrot is here shown to be enveloped in a horny covering, which renders the organ hard and inflexible.—J. S.

A. *a.* 150. The tongue of a white spoonbill. (*platalea leucorodia,*) In this bird, the size of the tongue bears no proportion to that of the mandibules: the bill is six or eight inches long, and terminated by a broad extremity, whilst the tongue does not exceed either in length or breadth one fourth of an inch: it is enveloped in a horny case, which on the dorsum is formed into a fringe along the posterior margin.—J. S.

A. *a.* 151. The tongue of a woodcock: (*scolopax rusticola.*) it is long, narrow, and pointed, and differs from that of the spoonbill in being large enough to fill the space between the mandibules.—J. H.

A. *a.* 156. The upper mandibule of a duck, (*anas boschas,*)

showing the great size, and number of the nervous ramifications distributed along the margins and point.—J. S.

A. *a.* 157. The tongue of a wild-duck. (*an. bosch.*) Its structure is complex: the tip consists of a semicircular piece of elastic horn with a double row of marginal fringe, from which a plate of bone runs back through the lower part of the tongue to be articulated with the os-hyoides: the dorsum near the base is elevated in the middle by a thick coating of cuticle, and at the sides is furnished with several rows both of horny and soft papillæ.

A. *a.* 171. The œsophagus of a turtle. (*testudo mydas,*) The whole mucous surface presents a stratum of numerous, large, sharp, horny papillæ, lying on their sides and pointed in the direction of the stomach.—J. S.

A. *a.* 172. A piece of cuticle removed by maceration from the surface of the œsophagus of a turtle and prepared by drying. The cylindrical form of the canal is retained in the cuticle for a length of about three inches, and the form and position of the papillæ are preserved as accurately as in the wet preparation, marked 171. The strength of the cuticular membrane is so great as to have allowed of being turned inside out, after detachment from the chorion.—J. H.

A. *a.* 177. The tongue of an alligator. (*lacerta allig.*) Its surface is smooth, without papillæ, and covered with a firm opaque cuticle. The nerves, exhibited on the lower surface, are remarkably large, and decussate in the mesian line,—their branches passing to supply the sides of the organ opposite to those at which the trunks are placed. The late Mr. Shekleton, who noticed this fact in 1822, has remarked, "that it is the most clear case of nervous decussation he is acquainted with."—J. S.

A. *a.* 179. The tongue of a chameleon, (*lacerta chameleon.*) remarkable for its powers of darting to a distance of several inches to seize the insects it feeds on. The whole animal is preserved, and the tongue partially drawn from the mouth.—J. S.

A. *a.* 180. The os-hyoïdes and tongue of a chameleon: (*lacerta chameleon,*) the os-hyoides consists of a body, a long style on which the tongue is folded when at rest in the mouth, and four cornua for the attachment of muscles. The tongue is divisible into an *erectile* and *prehensile* portion,—the former, next to the os-hyoides, is shown from the length to which it has been stretched in the preparation, to be very extensible, to be traversed with bloodvessels filled with quicksilver, to be accompanied on each side by a long muscle, the

hyo-glossus, for drawing back the organ after its propulsion, and to be furnished from end to end with a central flexible tube for gliding off and on the smooth style. The prehensile portion is also shown in the preparation to be attached to the moveable end of the former, to be furnished with a glutinous cup at the extremity, for holding insects, to be traversed with the same soft tube for adapting it on the style, and to be provided, in addition, with an annular muscle for holding the tube firmly on that slippery bone, when the organ, lying in the mouth, is employed for the common purposes of mastication.—J. H.

A. *a.* 190. The skull of a rattlesnake, (*crotalis horridus,*) showing the attachment of the poison fangs to the superior maxillary bones.—J. H.

A. *a.* 191. The fangs of a rattlesnake, detached from the jaw, to show that they are each traversed by a canal running from root to point, which serves for the conveyance of the deadly poison of the gland into the flesh of their wounded victims.—J. H.

A. *a.* 192. The poison gland of a rattlesnake removed from its connection with the head: a slice has been cut away from the internal surface, whereby its cellular nature is demonstrated; and attached to the outside is shown the muscle by which the poison is squeezed into the duct: the origin of the duct from the anterior part of the gland is indicated by a black bristle; and from the opposite angle may be noticed the ligament by which its connection with the skull is mainly established.—J. H.

A. *a.* 193. The poison gland of a rattlesnake in its place on the side of the head: the posterior connecting ligament and the compressor muscle spread over its external surface are clearly shown; and a bristle which has been conducted from the anterior extremity of the gland along the duct, and thence through the canal in the fang, describes the course of the poison in being insinuated to the bottom of a wound.—J. H.

A. *a.* 194. The œsophagus of a rattlesnake: (*crot. horrid.*) the mucous membrane is very thin and dilatable, and enveloped in a delicate fibrous expansion: two strong, flattened bands of muscular fibres, attached by one extremity to the base of the skull, and at the other spread over the stomach, lie along the sides—and though placed parallel to each other take a slightly spiral course: a portion of that belonging to the left side is shown in the preparation.—J. H.

A. *a.* 195. The tongue of a serpent: the end is bifurcated,

horny and finely pointed: the root is soft and fleshy, and enclosed in a sheath of mucous membrane, out of which it is unrolled in the act of darting from the mouth.—J. S.

A. *a.* 205. The intestinal canal of a frog. (*rana temporaria.*) The upper jaw has been cut away to show the peculiarities of the tongue; this organ grows by its tip to the symphisis of the chin, and is unattached and moveable at its posterior, broad, flat, and bifid extremity. Frogs by such mechanism have a power of throwing out the organ to seize flies or other insects: the snoaring sound uttered by them is also ascribed to the action of the air during expiration on the thin flapping margin. The stomach and intestines, the liver, ovaria, oviducts, heart and lungs are all demonstrated in their proper situations.—J. H.

A. *a.* 215. The mouth of a lamprey-eel. (*petromyzon fluviatilis.*) It bears the form of a funnel-shaped sucker, in the interior of which several rows of teeth are placed: its construction resembles that of the sucker of a leech, and by it the fish can attach itself so closely, as to admit of being raised out of the water with a stone 10 or 12 pounds in weight pendent from its mouth: a circular piece of cartilage constitutes the jaws or circumference of the aperture.—J. H.

A. *a.* 216. The teeth of a ray: (*raja batis,*) they are flat and lozenged-shaped, and arranged in rows like pavement: they are confined to the jaws—the larger being in the centre; the smaller in the direction of the articulations: they grow from the gums, and are encrusted with a beautiful white enamel.—J. H.

A. *a.* 217. A transverse section of the œsophagus of a dog-fish, (*squal. canic.*) showing the condition of the muscular and mucous tunics during the state of emptyness—the former appears thick and even on the outer surface; the latter exhibits in the section, a waving zig-zag arrangement, filling up completely the cavity.—J. H.

A. *a.* 218. A portion of the gum of an angel shark, (*sq. squatina,*) showing the growth of the teeth from this texture without having any deeper connection. The teeth are triangular, flattened, and serrated, and so placed on their sides as to be all pointed in a direction more or less backwards.—J. H.

A. *a.* 224. The jaw-bone of a frog-fish, *(lophius piscatorius)* shewing the form and structure of the teeth; they are flat and lancet-shaped, and stand upright with their points inclined somewhat backwards: they are connected to the jaw by thin, elastic plates of bone, the full breadth of

their base, which possessing sufficient firmness to support the teeth in the performance of their proper functions, give them likewise the power of springing and yielding without fracture under the shocks to which in so ponderous and so voracious a creature they must be necessarily exposed.—J. H.

A. *a.* 225. The angling apparatus of a frog-fish, (*loph. piscat.*) by which the animal is said, when secreted in the sand, to decoy other fish towards its enormous mouth and make them an easy prey.* The preparation shows the porte-filets and its two angling filaments, the articulations between which, consist of two perfect rings hooked in each other, and joined so loosely as to allow of great latitude and variety of motions. The extremity of the anterior filament is surmounted by a membranous fringe which gives it the appearance, when moved about under water, of the tail of a small fish—(see 226, 227.)—J. H.

A. *a.* 226. This preparation shews the position of the angling apparatus on the top of the skull, together with the numerous and complicated muscles by which the various movements of the porte-filets and filaments are effected. Twenty-two muscles may be enumerated.—J. H.

A. *a.* 227. The posterior angling filament of a frog-fish : it is articulated with the occiput without the intervention of a porte-filet, and is furnished with six proper and distinct muscles.—J. H.

A. *a.* 228. The mouth of a sturgeon, (*acipenser sturio.*) The aperture of the mouth is small, and the cartilaginous maxillæ are covered with toothless gums. Two long feelers or cirri are shown hanging beneath the chin.—J. H.

A. *a.* 229. The teeth of a lump-fish : (*cyclopterus lumpus.*) They are small and pointed, and placed in the jaws and pharynx.—J. H.

A. *a.* 235. The mouth of a conger eel : (*muræna conger.*) Both jaws and the vomer are roughened with short, straight, strong and serrated teeth.—J. H.

A. *a.* 236. The teeth of a sea wolf: (*anarhichas lupus,*) some placed on the jaws and mandibules are large and conical ; and others on the vomer and palate form broad hemispherical tubercles. The pharynx presents numerous small conical teeth.—J. H.

A. *a.* 244. The tongue of a hollybutt : (*pleuronectes hippoglossus,*) the organ is short, inflexible and continuous with the osseous basis on which the laminæ of the branchiæ are supported. See C. *a.* 159.—J. H.

* Annales des Sciences Naturelles, Tome 2, 1824 ; also Dublin Philosophical Journal, No. 1.

A. *a.* 248. The head of a salmon prepared to show the teeth. It may serve as an example of a fish with teeth in every situation in which teeth are found in this class of animals, viz :—the jaws, palate, vomer, tongue, branchiæ and pharynx.—J. H.

A. *a.* 256. The mouth and œsophagus of an eight-armed cuttle-fish : (*sepia octopus,*) the mouth, placed in the centre between the tentacula, consists of a strong horny bill like that of a parrot, surrounded by three rows of membranous fringes or lips : the bill is implanted at the orifice of a hollow muscular cavity from the opposite side of which the œsophagus takes origin. All these parts, together with some of the nerves arteries and veins, are exhibited. See prep. 257, which gives a view of the same structures in the sepia officinalis : see also 258, a single horny bill prepared and demonstrated separately, and 259, a bottleful of them found in the stomach of a delphinus diodon taken in Killiney bay near Dublin.—J. H.

A. *a.* 260. The tongue of a limpet : (*patella.*) it is horny, pointed and serrated, and longer than the entire animal.—J. S.

A. *a.* 270. The teeth of a leech : (*hirudo officinalis,*) there are three of equal size, placed at the bottom of the sucker formed by the annular lip : they are soft and cartilaginous, and to all appearance badly adapted for making those sharp, linear incisions which characterize their bite.—J. H.

A. *a.* 271. The mouth of a crab : (*cancer mœnas,*) the jaws, formed of the same material as the shell, are placed laterally, and have sharp cutting edges like scissors, serving the purposes of powerful teeth.—J. S.

A. *b.* 285. A stomach taken from the body of a man who was executed when in rude health : it presents the usual pyramidal shape.—J. H.

A. *b.* 286. An human stomach prepared to exhibit the circular constriction near the pylorus described by Sir E. Home.—J. S.

A. *b.* 287. A preparation of the stomach of an adult showing the structure and arrangement of the glandulæ Peyeri.—J. S.

A. *b.* 288. The stomach and spleen of an human fœtus about the sixth month, exhibiting the globular shape of the former, and the great proportional size of the latter.—J. H.

A. *b.* 300. The stomach of a monkey. It is somewhat more conical than that of the human subject : it is also thicker and more muscular at the pyloric extremity, and internally exhibits, at the large end, a partial cuticular lining.—J. S.

A. *b.* 306. The stomach of a dog, injected. It is divided into two compartments—the larger adjoining the œsophageal orifice presents internally numerous rugæ coated by a fine, though distinct cuticle—the smaller leading to the pylorus is more uniform, glandular and villous on the mucous surface.—J. S.

A. *b.* 307. The stomach of a kanguroo: (*didelphis gigantea,*) It has but a single cavity, is very long, and wide, and coiled upon itself; it is tucked into cells, by broad muscular bands, like the colon. The cardiac extremity forms a cul-de-sac which is subdivided into two at the most prominent part: of these little sacs one is remarkably thick and glandular in the recent state—the other is smooth, whitish, and rugous.—J. S.

A. *b.* 308. The stomach of an opossum: (*didelphis virgineana.*) The œsophageal and pyloric orifices are near each other: numerous muscular fibres surround the lower end of the œsophagus: the pyloric glands are very large and abundant.—J. H.

A. *b.* 309. The stomach and intestines of a batt, preserved in spirits: (*vespertilio murina,*) The stomach is a simple cavity, membranous, and globular, and its orifices lie near to each other: the intestines are short and straight, and devoid not only of cœcum, but of any thing to mark a distinction between the small and large intestines—a quality of digestive tube which corresponds with the insectivorous habits of the animal. The spleen is shown attached to the great extremity of the stomach.—J. H.

A. *b.* 310. The stomach of a bear, (*ursus Americanus.*) about six months old, preserved in spirits: its form, structure and dimensions are well exhibited.—J. H.

A. *b.* 322. The stomach of a rabbit: the mucous membrane is smooth and villous: the cavity appears divided into two compartments by a circular constriction near the pylorus. The preparation though uninjected is very pretty and instructive.—J. H.

A. *b.* 323. The stomach of a rat (*mus rattus*) exhibiting a wart-like excrescence in the cardiac extremity where the organ is lined with cuticle: the animal when killed was in good condition, and its stomach filled with food.—J. H.

A. *b.* 325. The stomach of a rat in a healthy state: the cardiac end is covered internally with cuticle; the pyloric is highly vascular and villous: a circular defined line marks the distinction between them.—J. S.

A. *b.* 340. The stomach and cæcum of a horse. (*Equus caballus,*) The stomach forms a simple conical cavity: the œsophagus is inserted into the middle of its concave border, making the cardiac and pyloric bags nearly equal: the left compartment is lined with cuticle like the œsophagus, the right is soft and villous: a prominent fold of mucous membrane marks the line of demarcation between them. The cœcum which receives the ilium by a small slit-like aperture is wider and longer than the stomach.—J. S.

A. *b.* 341. The stomach of a pig: (*sus scrofa,*) It is somewhat globular; the œsophagus opens nearly mid-way between the two extremities; a circular constriction partially divides the cavity into two cul-de-sacs, of which the left is large, and very prominent in front; whilst the right is conical, and diminishes uniformly towards the pylorus.—J. H.

A. *b.* 343. The stomach of a peccari: (*sus tagassu,*) the middle part which receives the œsophagus is separated from the right and left by sulci: the left extremity, or great cul-de-sac, is cuticular and bifid—the right, which is villous, presents a little prominence near the pylorus.—J. H.

A. *b.* 350. A portion of the first stomach or paunch of a young goat, injected. This is the largest compartment of the stomach; it is lined with cuticle: its papillæ are small and pointed: the vascularity of the mucous membrane has been shown by the removal of a portion of the cuticle.—J. S.

A. *b.* 351. A portion of the second or honey-combed stomach, from the same animal as that of 350: it is covered with cuticle under which may be seen numerous fine papillæ. J. S.

A. *b.* 352. The third and fourth stomachs of a young goat, the same as the two former: the third is the smallest of the compartments: it is named "plicated" from the leaf-like arrangement of the mucous membrane: this cavity like the paunch and honey-combed is coated with cuticle. The fourth is the proper digestive cavity and resembles somewhat the human stomach in form and structure: it is pyramidal, highly vascular, and devoid of cuticle. Considerable injury had been done to the structures of the last named cavity by the solvent gastric juice, before the injection and preservation of the organ were accomplished.—J. S.

A. *b.* 353. The stomach of a full grown goat, (*capra hircus*) inflated and dried: this preparation affords an instructive example of a truly ruminating stomach; all the cavities and apertures are shown.—J. S.

A. *b.* 354. The stomach of a fœtal calf, inflated and var-

nished : (*bos taurus*,) the preparation shows the groove which at this period of life leads from the œsophagus to the fourth or digestive stomach, for the direct conveyance of the milk into that cavity.—J. H.

A. *b*. 355. The stomach of a fœtal calf (wet preparation) showing the structure of the organ at such an age ; the proportionably small size of the paunch ; and the milk-groove established between the œsophagus and fourth stomach.—J. H.

A. *b*. 356. The first row of cells in the paunch of a dromedary : (*camelus dromedarius*,) there are two rows in this cavity ; one on each side of a prominent muscular ridge which extends from the opening of the œsophagus into that leading to the second division of the stomach : these cells which are large and deep are lined with cuticle, and furnished with thick bands of muscle at their mouths which serve to close them when full.—J. H.

A. *b*. 377. The second row of cells in the paunch of a dromedary : they are large and wide and much like those in the first row.—see 377. J. H.

A. *b*. 378. A section of the paunch of a dromedary, showing the thickness of the muscular coat and the distinctness of the cuticular lining ; the cuticle is so strong that by maceration it can be removed from the mucous surface in large patches.—J. H.

A. *b*. 379. A piece of cuticle taken from the paunch of a dromedary, and dried ; it is thick, firm and opaque.—J. H.

A. *b*. 380. The second stomach of a dromedary—(*camel. dromed.*) the bonnet or honey-combed stomach of other mammalia : it presents numerous rows of cells from the bottoms and sides of which other cells of smaller dimensions project, all equally formed of muscular parietes, and furnished with strong sphinctors at their mouths. The entire of this compartment of the stomach is lined with cuticle ; the cells are all arranged on one side ; and at the opposite, a thick prominent muscular band extends from one orifice to the other, for the purpose of approximating them in transferring the ruminated food from the œsophagus across the celled-stomach, in which only pure water is held, into the third cavity. This muscular band is shown at A. *b*. 382.—J. H.

A. *b*. 381. The third stomach of a dromedary. It is very small, and may be considered rudimental of the third or laminated stomach of other ruminants : the entire of it is preserved in a small bottle : it is devoid of cuticle, and presents only a few irregularly plicated eminences.—J. H.

A. *b*. 382. The strong muscular band which connects the

œsophagus with the opening leading into the third stomach in the dromedary.—J. H.

A. *b.* 383. A part of the fourth stomach of a dromedary : this division of the stomach is long and narrow : the mucous membrane is devoid of cuticle ; it is thrown into numerous longitudinal rugæ at the end next the third cavity, and becomes smooth, and thick towards the pylorus. The duodenal extremity is so dilated as to give the appearance of an additional or fifth cavity.—J. H.

A. *b.* 384. A section of the fourth stomach of a dromedary, showing the thickness of its walls, and the plicated condition of its mucous membrane.—J. H.

A. *b.* 385. A full-sized painting on canvas of the stomach and intestinal canal of a dromedary : the form, size, and relative position of the several compartments may be readily learned from an inspection of this picture.—J. H.

A. *b.* 386. The first cavity or paunch of the stomach of an alpacca, (*camelus lama.*) preserved in spirits and showing one of the rows of cells. The preparation demonstrates the resemblance between the paunch of the stomach in this animal and that of the dromedary shown at A. *b.* 376.—J. H.

A. *b.* 387. The second or celled stomach of the alpacca. In the structure and arrangement of its cells it is like the same compartment in the stomach of the dromedary, described at 380.—J. H.

A. *b.* 398. A dried preparation of the stomach of a seal : (*phoca vitulina*) it is a single oblong cavity with thick walls. The interior is brought into view ; and the opening of the duct of the gall bladder into the duodenum about one inch and half from the pylorus is demonstrated. The cœcum of a seal, marked A. *c.* 481, is preserved in the same case.—J. H.

A. *b.* 399. A section taken from the stomach of a seal after injection. The muscular coat is remarkably thick ; and the mucous membrane highly rugous and vascular.—J. H.

A. *b.* 405. The stomach of a porpess. (*delphinus phocæna.*) The animal from which this stomach was taken was very young : the mucous surface is beautifully red from injection : the division of the stomach into four cavities is well exhibited.—J. S.

A. *b.* 406. A dried specimen of the stomach of a whale. (*delphinus diodon*) Its eight cavities and the apertures of communication between them are all shown.—J. S.

A. *b.* 407. The stomach of an eagle. There is a crop, a membranous stomach, and a ventriculus succenturiatus in the form of a collar around the infundibulum : neither the

œsophagus, crop, or stomach possess any evident cuticular lining.—J. S.

A. *b.* 418. The stomach and part of the œsophagus of a sparrow-hawk. The ventriculus succenturiatus is very evident. On each side of the stomach there is a small, flat, round tendon about the size of a silver penny, from which the muscular fibres of the organ take their origin : In this respect the parietes of the stomach bear a resemblance to the more fully developed tendinous and muscular structures of a gizzard. J. H.

A. *b.* 426. The œsophagus, stomach and intestines of a macaw. (*macaceros macao.*) The *œsophagus* is short and wide : the crop large, thin, dilatable and vascular : the ventriculus succenturiatus is thick and glandular, and large and stomach-like where it joins the gizzard : the gizzard is not larger than a good sized hazel-nut, and has more the appearance of a knobby appendix to the infundibulum, than a part of the organ from which much assistance could be derived in the process of digestion. Most probably in this bird, which was very old, and had been a long time domesticated and fed chiefly on pap, the condition of the stomach had been changed from that which in the natural state adapts it for bruising the husks and shells of fruit, to that more suitable for the chymification of soft and digestible materials. The intestines are long and without *cæca*.*—J. H.

A. *b.* 427. The stomach of a parrot (*psittacus cinereus.*) The preparation shows the crop, gizzard, and intestines.—J. H.

A. *b.* 428. The stomach of a cuccoo : (*cuculus canorus*) the stomach is membranous and its mucous surface is covered with fine short hairs.—J. S.

A. *b.* 429. The stomach of a cuccoo : the mucous surface is smooth and villous, and free from any hairs. When first opened, the interior was filled with the down and wings of insects which adhered extensively to the viscid mucus, and gave to the surface the appearance of a coating of hairs.—J. H.

A. b. 436. The crop taken from an old pigeon, (*columba*

* The death of this animal was caused by a round, firm, whitish tumor which grew in the coats of the intestine, about a foot and a half from the cloaca, and obstructed the passage through the bowels : the part of the gut above the tumor was distended with alimentary matter in a semifluid state, and appeared thick and large—that below, which naturally is the widest part, was small, attenuated and empty. Similar diseased tumors were found in the liver and spleen. The skeleton, also, presented a specimen of the re-union of broken bones—one thigh and tibia having been fractured at some former period, and strongly, though not very elegantly, repaired by irregular masses of callus.

livia. Briss.) at a time when unconcerned about its young: at this period, when the cavity serves only as a receptacle for grain, it is smooth, thin and membranous, and unlike the same organ at the time when the animal is engaged in providing nourishment for its offspring.—J. S.

A. *b.* 437. The crop of an old pigeon taken a few days after the young which it hatched had escaped from their shells: by a comparison with the other, (No. 436.) it may be seen that the walls have become thick, and the glands enlarged: the secretion from the glands, when first examined, was in such abundance as to fill the crop: it resembles the curd of milk, and is given as food to the young pigeon while still tender, and unable to digest seeds. In preparation 438, this nutritious matter is shown transferred into the crop of the young animal.—J. S.

A. *b.* 438. The crop of a young pigeon filled with the curd-like substance mixed with a few grains of oats which had been transferred to it from the crop of its parent.—J. S.

A. *b.* 439. The crop of a peacock (*pavo cristatus.*) lined with cuticle and studded all over the interior with numerous solitary mucous follicles.—J. H.

A. *b.* 440. The gizzard and infundibulum of a peacock. The infundibulum is thick and glandular: the substance of the gizzard is highly muscular and tendinous; and the cuticular membrane is rugous, hard, and dry.—J. H.

A. *b.* 441. The stomach of a domestic fowl: (*gallus domesticus.*) there is a large membranous crop—an infundibulum and glandular structure at the bottom of the œsophagus shown by the injection to be highly vascular—and a strong muscular gizzard lined with a hard cuticle, the surface of which is raised and depressed by alternate ridges and furrows.—J. S.

A. *b.* 442. The stomach and intestinal canal of a domestic fowl: (*gal. domestic.*)—this preparation shows an œsophagus, crop, gizzard, intestine, and pancreas in a perfect and well marked state.—J. H.

A. *b.* 443. The stomach and part of the œsophagus of an ostrich. There is no crop: the ventriculus succenturiatus is very large, pyramidal and muscular, and furnished internally along the convex border with a broad patch of mucous follicles, the orifices of which are patulous, and placed at nearly equal distances from each other. The gizzard is very powerful: at the inferior and left side it is connected to the abdominal parietes by a short strong tendon, (shown in the preparation): the cuticular lining is thick and disposed in broad patches separated by fissures: the openings of the

ventriculus and duodenum are near each other, and neither of them is furnished with any valve. In the connected state of the parts, the bag of the ventriculus passes considerably behind that of the gizzard.—J. H.

A. *b.* 451. The stomach of a spoonbill : (*platalea leucorodia*) the stomach is of a character intermediate between that of the membranous cavity of carnivorous birds, and that of birds which live solely on grain : there is no crop ; the glands of the infundibulum are arranged in two clusters, one on each side : it is lined with a thick pulpy cuticle which has little subjacent adhesion. The spoonbill which is naturally a fish-eating bird, had in this instance, been a long time domesticated and accustomed to feed on grain.—J. S.

A. *b.* 452. The stomach of a curlew : (*scolopax arquata.*) It is without crop, but is furnished with a double row of glands at the infundibulum, and with a strong cuticular gizzard.—J. S.

A. *b.* 460. The stomach of a wild swan : (*anas cycnus.*) there is a well marked gizzard : the ventriculus succenturiatus or cluster of œsophageal glands makes a prominent feature in the preparation.—J. H.

A. *b.* 461. The stomach of a cormorant. (*pelicanus carbo.*) In this bird which is purely piscivorous there is no crop : the œsophagus, in the form of a wide muscular funnel, is surrounded at the bottom by a double band of glandular substance : the stomach is thin and less muscular than the œsophagus ; and the mucous membrane lining it is soft and villous.—J. S.

A. *b.* 462. The stomach of a northern diver : (*colymbus stellatus.*) the œsophagus is very muscular, and widens towards the stomach, near which it is surrounded by a single belt of glandular structure : the stomach is thicker than the œsophagus, and is manifestly lined with cuticle.—J. S.

A. *b.* 463. The gizzard and duodenum of a goose : (*anas anser.*) the former exhibits powerful muscular and tendinous structures ; the tube of the latter is small, and its coats exceedingly thin and pale : the openings of the œsophagus and duodenum in the gizzard are within half an inch of each other.—J. H.

A. *b.* 475. The stomach of a turtle : (*testudo mydas.*) it is long, funnel-shaped, and curved at an acute angle on itself : the cardiac extremity is of the same size, and in the same line with the œsophagus from which it is only distinguished by the abrupt termination of the horny papillæ of that tube : its mucous membrane is devoid of any marked villi, and dis-

posed in longitudinal rugæ exhibiting many glandular orifices: a pyloric muscle, and an abrupt change in the disposition of the rugæ mark the line of demarcation between it and the small intestine. The preparation is beautifully injected.—J. S.

A. *b.* 477. This preparation is intended to show the different structures entering into the composition of the stomach of a turtle. (*testudo mydas.*) A portion, taken from a stomach previously injected, has been so dissected as to exhibit the several strata of mucous, muscular, and peritoneal tunics. J. S.

A. *b.* 487. The stomach of an alligator: the œsophageal and pyloric orifices are closely approximated, and the bulging extremity is near the pylorus: a central tendon on either surface gives origin to the fibres of the muscular coat.—J. H.

A. *b.* 488. The œsophagus, stomach, and a portion of the duodenum of a young alligator: (*lacerta alligator.*) the stomach is nearly circular: a tendon is placed on each side from which the muscular fibres radiate as in some carnivorous birds, (see A. *b* 418.) making as in them an approach to the arrangement of tendon and muscle in the gizzard of birds purely granivorous: the œsophageal and pyloric orifices are near each other; the former being very wide, the latter exceedingly narrow. The spleen is shown hanging at the back of the preparation; and the gall bladder remains suspended by the attachment of its duct to the duodenum. J. H.

A. *b.* 489. The stomach and intestines of a chameleon: (*lacerta chameleon.*) the canal is very short, and its width throughout nearly uniform: the stomach possesses the thickest coats: the intestines are contracted in several places, and stained blue, perhaps by the coloring matter extracted from half digested flies with which the whole canal is filled. J. H.

A. *b.* 500. The stomach and intestines of a rattlesnake: (*crotalis horridus*) the œsophagus is very wide, the stomach muscular, and the intestines short: the entire length of the canal is not equal to that of the body of the animal: the valve of the pylorus is prominent; the mucous membrane of the small intestine is thrown into lozenge shaped folds, and is unequally thick in different places. Three of the largest of the poison-fangs were found lying in the cavity of the rectum.—J. S.

A. *b.* 501. The stomach of a rattlesnake, dissected and opened: (*crot. horrid.*) the mucous membrane is disposed in longitudinal folds. The ducts from the liver and gall

bladder are shown to open into the commencement of the small intestines, after having passed through the substance of a glandular body, the pancreas.—J. H.

A. *b.* 525. The stomach and spleen of a scate. (*raja batis.*) It is partially divided into two portions : the internal membrane is smooth and white like that of the œsophagus, and forms, in the cardiac pouch, several prominent longitudinal rugæ : the line of demarcation between the œsophagus and stomach is defined ; that at the pylorus is little evident. The spleen is attached to the cardiac portion. J. H.

A. *b.* 526. The stomach and intestinal canal of a dog-fish, (*squalus caniculus*) injected : the stomach is oblong, and constricted near the pylorus—its mucous membrane is glandular and vascular : a beautiful spiral valve traverses the canal of the intestine from the pylorus to the anus, compensating for the shortness of the gut by the expansion of the mucous membrane over an extended surface.—J. H.

A. *b.* 527. The stomach and intestinal canal of an electric ray, (*raja torpedo*) filled with plaster : the œsophagus and stomach form one continuous and equally dilated tube : the pylorus is much narrowed : there are no cæcal appendages at the duodenum : the intestines are short and wide. The attachments of the oviducts at the sides of the cloaca are shown in the preparation.—J. H.

A. *b.* 535. The stomach and pancreatic gland of a sturgeon : (*acipenser sturio.*) The œsophagus and stomach are of the same width ; there is no mark between them, except a change in the character of the mucous membrane, that of the former being beautifully reticulated, whilst that of the latter is smooth and without rugæ or villi : there is a marked constriction near the pylorus, and the aperture leading into the duodenum is very narrow and bounded with a circular valve. The wide entrance of the pancreatic duct into the duodenum near the pylorus is made evident.—J. H.

A. *b.* 536. The stomach and duodenum of a frog-fish (*loph. piscat.*) injected : the coats of the stomach are thick and glandular ; the mucous follicles are numerous, large, and prominent ; the œsophagus and stomach form one tube of nearly equal dimensions throughout ; the passage into the duodenum is very narrow ; there are two duodenal appendages.—J. H.

A. *b.* 537. The stomach, duodenal appendages and intestine of a lump fish : (*cyclopterus lumpus.*) the stomach is pyramidal and contracted about the middle ; its coats are trans-

parent in many places, and studded with numerous mucous crypts, which give them a mottled appearance : the intestine is long, and narrow, and of nearly equal dimensions throughout : the pyloric appendices are numerous, and of the same structure as the intestines : they run together so as to form, previously to their entrance into the duodenum, five or six common tubes. They are filled with a white viscid fluid ; and are perhaps a modification of pancreas.—J. H.

A. *b.* 543. The stomach of a wolf-fish : (*anarhichas lupus.*) it is pyramidal ; its walls are thin ; a narrow fleshy passage leads to the duodenum ; there are no cæcal appendages near the pylorus.—J. H.

A. *b.* 550. The stomach and duodenum of a cod-fish : (*gadus morrhua.*) the muscular coat is very thick ; the inner membrane rugous, white and when fresh, covered with viscid mucus ; the tube leading to the duodenum is so narrow as not to permit the passage of any matter except the semi-fluid chyme ; the pylorus projects by a circular border into the intestine.—J. H.

A. *b.* 551. A soldier crab (*cancer bernardus*) concealed in a murex shell, found together as they appear in the preparation, in the stomach of a cod-fish marked 550—the earthy matter of the claws has been removed by the acids of the stomach rendering them soft and flexible though unchanged in shape. The earth on the surface of the shell has been similarly acted on by the solvent gastric fluids.—J. H.

A. *b.* 556. The stomach and intestines of a mackarel, (*scomber scombrus.*) filled with red wax and dried : the stomach is oblong and contracted in the centre—the intestine short—the pyloric appendages remarkably long and numerous.—J. H.

A. *b.* 557. The stomach and intestinal canal of a mullet. (*mugil cephalus*) A villous glandular structure like the ventriculus succenturiatus in birds surrounds the termination of the œsophagus : the stomach is formed into a fleshy gizzard lined with thick hard cuticle : a hollow, blind appendix projects from its cardiac extremity : the duodenum is furnished with numerous cæcal appendages : the intestines are singularly long and narrow.—J. H.

A. *b.* 559. The stomach of the John-dorèe : (*zeus faber.*) the stomach is small—the intestines long—the duodenal appendages numerous.—J. H.

A. *b.* 565. The stomach and swimming bladder of a large pike, (*esox lucius*) filled with plaster of paris : the œsophagus and stomach are not to be distinguished from each other

by their size ; they form a uniform, wide tube, which suddenly narrows at the pylorus ; the intestinal canal is about twice the length of the stomach, narrow, and of uniform dimensions from end to end. The swimming bladder which is nearly the length and width of the stomach communicates by a narrow tube with the œsophagus.—J. H.

A. *b.* 566. The stomach and intestines of a gar-pike : (*esox belone.*) the entire canal from the mouth to the anus is one uniform straight tube, without any distinction of cavities : the stomach is opened to show the villosity of the mucous membrane.—J. H.

A. *b.* 567. The same preparation as the foregoing showing the parts in their natural place in the body: the course of the canal, from one end to the other, is straight and cylindrical.—J. H.

A. *b.* 568. The stomach of a gillaroo trout from Lough Neagh. (*salmo fario.*) The coats are very thick and muscular like those of a bird's gizzard—the mucous membrane is thrown into numerous longitudinal rugæ—the cuticle is distinct but not so thick and hard as in the stomach of the mullet—several cœca open into the duodenum.—J. S.

A. *b.* 570. The stomach of a greyling or white trout : (*salmo thymallus*) it is oblong, membranous-like, and supplied with duodenal appendages.—J. H.

A. *b.* 580 The intestinal canal of a cuttle-fish injected : (*sepia officinalis.*) The commencement of the œsophagus is marked by the presence of two small glandular bodies considered to be salivary glands ; its termination in the stomach is also shown to be surrounded by a cluster of the same glandular bodies. There are two compartments, of nearly equal dimensions, in the stomach ; the first is a species of gizzard—thick and muscular, and lined with a firm cuticle ; when recently opened, this cavity contained the claws of crabs and shrimps, ground into small pieces by its mechanical powers. The second compartment communicates with the first by a very small canal which is surrounded by thick firm walls : this compartment, like the first, has a strong muscular coat ; but the mucous membrane lining it is fine and soft, and thrown into innumerable plicæ like those in the third stomach of ruminating animals : from its anterior part a muscular tube arises—straight, short, and about the thickness of the œsophagus, along the side of which it runs forwards for some way to open at the anus. The proximity of this anal opening to that of the ink-bag is shown in the preparation.—J. H.

A. *b.* 581. The intestinal canal of a cuttle-fish—the calmar : (*sepia loligo*) the œsophagus is here longer than in the former

and the cavities of the stomach are larger ; the first cavity is pyramidal ; it is especially muscular near the œsophagus, and is lined throughout with cuticle : the opening leading into the second compartment is very small and surrounded by a thick muscular sphincter : the second is much the larger of the two compartments, and is furnished anteriorly with a thin muscle which radiates in a most beautiful manner from a central silvery tendon ; posteriorly its texture is exceedingly thin and membranous. The rectum, a fine narrow tube, leaves its anterior part, and passing forwards, opens near the orifice of the ink-bag into the infundibulum. The second compartment in the stomach of the cuttle-fish would appear to perform the office of duodenum and small intestines : none but the finer and more digested particles of the aliment can reach it through the small opening of entrance, and beyond it there is no organ for chylification, the rectum which arises directly out of it being too short and small for such purpose : moreover, the contents of the cavity will be always found of a white, fluid, and chyle-like character.—J. H.

A. *b.* 582. The intestinal canal of a cuttle-fish. (*sep. loligo.*) The preparation is like that of No. 581, only that it is somewhat larger, and shows more clearly the strong cuticle which lines the first cavity or gizzard.—J. H.

A. *b.* 583. A beautiful preparation of the intestinal tube of the cuttle-fish, (*sep. loligo.*) dried and varnished. In making this preparation the canal was first carefully dissected from its connection with the liver and surrounding parts, and emptied of its contents : it was then gently inflated and dried : the œsophagus, stomach, and rectum are all shown. The dark pyramidal body with its apex close to the extremity of rectum, is the ink-bag : the size of this peculiar organ has been much more reduced, in the drying, than the other parts of the preparation ; sufficient, however, remains to demonstrate its situation and figure.—J. H.

A. *b.* 584. The intestinal canal of a cuttle-fish—the poulpe. (*sepia octopus.*) The œsophagus about its centre is dilated into a crop—like that of birds : the compartment which follows is a true gizzard, formed of strong muscular parietes and lined with a gristly cuticle : the third and last dilatation is fine in texture, and makes a lightly spiral turn. The fact of the hepatic ducts opening into this cavity may favour the opinion of its being a modification of intestine or cœcum. The remaining intestine is somewhat larger than that in the calmar, and unlike it, makes a few convolutions previously to reaching the anus.—J. H.

A. *b.* 593. The stomach of a *bulla lignaria* : it is like a gizzard formed of two strong radiated muscles united by two common tendons, and furnished internally with grinding teeth. The œsophagus before entering the stomach is dilated into a kind of crop. Prepared by Mr. Roche.—J. H.

A. *b.* 595. The intestinal canal of an oyster (*ostrea edulis*). The stomach is enclosed in the liver and receives therein the bile ducts: the intestine, after a single turn in the liver, runs backwards to the anus: the rectum is shown to pass free of any contact with the heart, making in this respect an exception in the case of acephalous mollusca.—J. H.

A. *b.* 596. A razor fish (*solen siliqua*) prepared to show the rectum at the place where it passes through the substance of the heart.—J. H.

A. *b.* 597. A cockle (*cardium edule*) to show the crystalline style peculiar to this class of animals: this style, the use of which is unknown, is a transparent piece of cartilage contained in a sheath applied to the commencement of the intestines: the point of the style is free and uncovered in the cavity near the pylorus.—J. H.

A. *b.* 620. The intestinal canal of a leech (*hirudo officinalis*): it is a simple straight cavity with two openings, and several lateral blind appendages. The anus situated near the tail is an opening not larger than a pin-hole.—J. H.

A. *b.* 621. The posterior half of a leech which lived and moved for a period of ten months after being separated from the anterior part of the body. The animal after abstracting blood from a patient was accidentally broken into two during the process of emptying the stomach of the engorged blood: the posterior half being found alive, after some days, in the basin into which it had been accidentally thrown, it was taken up and preserved carefully in a glass of water: for some time the water became tinged with the blood which oozed from its lacerated body, but by degrees a perfect cicatrization was accomplished, without leaving a trace of the smallest aperture by which either nutriment could have been imbibed or fluids discharged; and, nevertheless, the nutrition and powers of motion of the animal continued in perfect and full operation. It increased considerably in size, and moved about the cicatrized extremity of its body, with great agility in water while sticking by the sucker of its tail to the inside of the glass in which it was preserved. This leech was given to me by Mr. Roche shortly after the accident which deprived one half of its body of life, and was preserved in my possession during the remainder of its demi-existence. Its

death arose from neglect in not changing sufficiently often the water.—J. H.

A. *b.* 622. The digestive canal of a sea-mouse (*aphrodita aculeata*). The œsophagus is very short and opens by a valvular passage into a gizzard or stomach, which as to size and shape somewhat resembles an almond : it is strong and lined with a firm cuticle : its muscular fibres are transverse near the cardiac extremity, and longitudinal in the neighbourhood of the pylorus. The intestine appears as a straight tube, with a number of lateral blind appendages.*—J. H.

A. *b.* 623. The intestinal canal of a lug-bait (*lumbricus marinus*). There is no exterior fleshy part or trunk : the œsophagus is long, the stomach sacculated on the surface, the intestine thin, straight, and smooth.—J. H.

A. *b.* 624. The intestinal tube of an earth-worm. There is little division into stomach and intestines : the canal is long, larger near the head than the anus, and divided into numerous little sacs, formed by the membranes which attach it to the exterior envelope of the body.—J. H.

A. *b.* 630. The stomach of a lobster (*cancer gammarus*). Three calcareous masses guard the pylorus : their surfaces are polished and furrowed by alternate elevations and depressions.—J. S.

A. *b.* 631. A preparation to show the digestive canal of a crab (*cancer mœnas*). On the lower surface the hard, cutting, lateral lips may be observed : a piece of whalebone points them out. From above (the back shell having been cut away) the same piece of whalebone is shown coming through the œsophagus into the stomach which is triangular in shape, and somewhat cartilaginous in texture. The intestine arises from the posterior angle of the stomach and runs horizontally backwards in the mesial line : it leaves the abdominal cavity posteriorly, enlarging a little at the point of exit, and thence runs along the under surface of the tail to near the extremity of that region where the anus is placed, as demonstrated in the preparation by a slip of whalebone.—J. H.

A. *b.* 632. This preparation exhibits the whole intestinal tube with the hepatic organ of a cray-fish (*cancer astacus*). The two long plates forming the opening of the mouth are held apart to expose the bill which is placed inside them. The œsophagus and stomach are opened—the former ascends from the mouth towards the dorsum of the animal, the latter

* The Baron Cuvier considered that the anterior fleshy portion should rather be looked upon as a trunk or proboscis, admitting of being protruded from the mouth.

is a large triangular cavity containing calcareous plates at its pyloric angle : the mucous membrane lining the œsophagus and stomach is of a horny, brittle texture and nearly transparent. The intestinal canal is straight, of an uniform size throughout, and uninterrupted by any transverse valvulæ conniventes : the mucous membrane of the intestines is soft, villous, and thrown into numerous longitudinal plicæ : the anus assumes the form of a transverse slit bounded by two projecting cartilaginous bodies. The liver is shown in its place near the stomach ; it is of a yellowish colour, and consists of a congeries of fine tubes. See A. *d.* 1135.—J. H.

A. *b.* 652. The stomach of a cricket. The stomach is remarkably large, and divided into two compartments by a circular contraction.—J. S.

A. *b.* 660. The stomach and a portion of the intestine of a sea-urchin (*echinus eschulentus*). The extraordinary complication of teeth, called Aristotle's lantern, is shown ; the teeth are five in number ; their points may be seen outside the shell, and from the centre of their junction internally the intestine commences—J. H.

A. *b.* 661. The anal extremity of the intestine of the sea-urchin (*echin. eschul.*) preserved, together with the portion of shell belonging to it. The thickness of the intestine is nearly uniform throughout ; the opening in the shell for the anus is opposite to that of the mouth. The ovarium is shown divided into five portions.—J. H.

A. *b.* 662. The stomach of a five-armed star-fish, (*asteria rubens*) detached from the body : it is in the form of a bag with one opening serving both for mouth and anus : from the sides of this bag a short pouch projects into the commencement of each arm : its structure is so thin as to appear membranous.—J. H.

A. *b.* 663. The stomach of a star-fish in situ (*ast. rubens*) : The preparation shows the opening of the mouth on the lower surface, in the centre between the arms ; it shows also the slight projection which the bag makes into the hollow space in each arm—see 662.—J. H.

A. *c.* 685. A portion of small intestine from the human subject, injected, and everted to show the villi and valvulæ conniventes —J. S.

A. *c.* 686. A piece of small intestine, dried, showing the diverticulum or digital process of the ileum.—J. H.

A. *c.* 687. A diverticulum on the ilium of the human subject, about one inch and half in projection—The preparation is inflated and dried.—J. H.

A. *c.* 688. A diverticulum on the human intestine. This preparation was taken from a young woman who died of fever; it forms a circumscribed bag about the size of a turkey's egg, and opens into the ilium at a point about three feet from the cæcum, by a passage sufficiently large to admit the endof the little finger : it is filled with a hard brittle matter, apparently the solid residue of fæces stained with bile. The omentum and intestine in the neighbourhood were closely joined to the tumor by adhesions the result of a former inflammatory attack : this woman had complained for many years before death of occasional very severe pains in the abdomen.—J. H.

A. *c.* 689. The intestinal canal of a child about nine years old, inflated and dried : the œsophagus, stomach, small and large intestines, and rectum are all preserved in such a manner as to demonstrate their natural relative position. The arteries are filled with red, the veins with black injection.—J. S.

A. *c.* 690. The cœcum of a fœtus about the sixth month—J. H.

A. *c.* 691. The cœcum of a child about the sixth year.—J. H.

A. *c.* 692. The cœcum of an adult man. These three preparations, 690, 91, 92, have been all made in the same way, viz :—The gut having been first filled and hardened in alcohol, it was then cut open and suspended in the same fluid, preserving its form, and showing the arrangement of its interior. The preparations exhibit the differences of form in the organ at different periods of life : in the fœtus the vermiform process is shown to be long and wide, the cœcum small, and the valves of Bauhin imperfectly developed : in the child the relative length of the process is lessened, the cœcum has become more marked, and the ilio cœcal valve more prominent : and in the adult the size of the process is greatly reduced, the valve has acquired its greatest degree of projection and the cœcum its fullest magnitude.—J. H.

A. *c.* 693. A section of the human colon in the contracted state, prepared to show the longitudinal and circular fibres under such circumstances—J. H.

A. *c.* 705. The small intestine of a green monkey (*simia sabœa*) : the glandulæ aggregatæ in some places are very distinct ; the valvulæ conniventes, and villi of the mucous membrane are scarcely discernible.—J. S.

A. *c.* 706. The cœcum of a monkey, dried (*sim. sabœa.*) ; it is proportionately larger than in man ; but is devoid of vermiform process.—J. S.

A. *c.* 707. The intestinal canal of a magot or barbary ape, inflated and dried. The whole tract of the tube from the œsophagus to the anus is prerseved and exhibited.—J. H.

A. *c.* 708. A preparation showing the œsophagus, stomach, and small and large intestines of a mandrill, (*simia maimon*) filled with plaster of paris. This is a ready and striking mode of demonstrating the form and dimensions of hollow organs admitting of being so treated.—J. H.

A. *c.* 714. The small intestine of a lioness (*felis leo*) ; the preparation is minutely injected, and shows that the villi are long and fine, and that there are no valvulæ conniventes on the mucous membrane.—J. S.

A. *c.* 715. A piece of small intestine from a panther, minutely injected (*felis pardus*) ; the mucous membrane forms no valvulæ conniventes, but is furnished with distinctly marked glandulæ aggregatæ.—J. S.

A. *c.* 716. A portion of small intestine from a dog, injected, and prepared to show the long, fine villi of the mucous membrane.—J. S.

A. *c.* 717. The cœcum of a dog : the mucous glands are large and numerous ; a marked line distinguishes the mucous membrane of the small from that of the large intestines—the former being covered with villi, the latter devoid of any appearance of such organization.—J. S.

A. *c.* 718. The cœcum of a dog, prepared by drying ; the cœcum is oblong, terminating gradually in a production like the vermiform process.—J. H.

A. *c.* 719. The stomach, and intestines of a badger, (*ursus meles*) filled with plaster of paris ; the small and large intestines run into each other without the intervention of any cœcum.—J. H.

A. *c.* 720. A part of the intestinal canal of a bear (*ursus Americanus*). There is no cæcum, nor is there much difference between the size or form of the small and large intestines.—J. H.

A. *b.* 721. The intestinal canal of an otter, (*lutra vulgaris*) injected with plaster ; there is no cœcum or other mark of distinction between the ilium and colon.—J. H.

A. *b.* 722. The intestinal canal of a small dog (*American breed*) filled with plaster of paris ; the cœcum and vermiform process are merely rudimental.—J. H.

A. *b.* 723. Intestinal canal of a domestic cat (*felis catus*) ; there is very little cœcum, and only a trifling difference in the appearance of the small and large intestines.—J. H.

A. *b.* 724. A piece of fat from the mesentery of a young bear (*urs. Americ.*) : It is white, firm, and very abundant. The animal died suddenly.—J. H.

A. *b.* 726. The small intestine of an opossum, (*didelphis virgin.*) injected : the villi are long and abundant.—J. S.

A. b. 727. The cœcum of an opossum : the projection of this part is greater than what is observed in carnivorous animals : the valves are not well marked : some glands are visible about the termination of the ilium.—J. S.

A. *b.* 728. The digestive canal of a coati mundi (*viverra nasua*) : the canal is short and without cœcum ; the intestines gradually enlarge in size to within a few inches of the rectum, where a sudden, and considerable narrowing of the gut is observable.—J. H.

A. *b.* 729. The intestinal tube of a hedge-hog (*erinaceus europeus*). The canal is filled uniformly with plaster so as to exhibit satisfactorily its natural length, dimensions, and arrangement into small and large bowels.—J. H.

A. *c.* 730. The small intestine of a porcupine, (*histrix cristata.*) injected red : there are no valvulæ conniventes ; the villi are remarkably long ; and here and there appear tinged with chyle.—J. S.

A. *c.* 741. The cœcum of a rabbit, (*cuniculus lepus*) dried and cut open, to show the beautiful spiral valve which winds along its cavity from one end to the other.—J. S.

A. *c.* 742. A piece of small intestine from a marmot, (*M. alpinus*) showing the arrangement of the fat which serves for nourishment to the animal while hibernating. It is disposed along the edge of the intestine in packets, laid side by side, like a string of beads, and bound together by the peritoneum. The animal from which this preparation was taken, died in the spring, and of course was less abundantly furnished with fat than it would have been found some months earlier, when, entering upon the season for lethargy, it was provided with a full winter store.—J. H.

A. *c.* 743. The intestinal canal of an agouti (*mus aguti*), filled with plaster : the small intestines are very long—the cœcum large and wide—the great intestine short, and of the same width as the jejunum. J. H.

A. *c.* 756. A piece of small intestine from a pig (*sus scrofa*), showing the glandulæ aggregatæ of the mucous membrane : they are thickly clustered together, and so arranged as to form a continuous, narrow, defined stratum along one side of the gut.—J. H.

A. *c.* 757. A piece of small intestine from a pig, showing several scattered mucous follicles—the glandulæ solitariæ. J. H.

A, *c.* 765. The small and large intestines of a fœtal calf, (*bos taurus*) to show the difference in their mode of arrangement. The small intestines are convoluted among each

other without any determinate order ; the large are folded regularly in long coils, placed parallel and close to each other.—J. H.

A. *c.* A piece of large intestine from a dromedary, (*camel. dromed.*) inverted to expose the mucous membrane, and to display a few of the glandulæ aggregatæ.—J. H.

A. *c.* 767. A slice of fat from the hump on the back of the dromedary. This preparation has been placed among the organs concerned in nutrition, on account of the function which it most probably fulfils to the animal, during periods of long privation of food. The dromedary can perform protracted journeys on arid sands where it finds little either for nourishment or drink, and during which the enormous heap of fat, of which the hump is entirely composed, is gradually absorbed as a supply of food ; whilst the water cells of its stomach, well stocked in commencing the journey, are gradually emptied in affording the necessary drink.—J. H.

A. *c.* 775. A piece of small intestine from a seal, (*phoca vitulina*) injected : the villi are long and fine—there are no valvulæ conniventes—the small intestines are very long—their coats thick—and their calibre narrow. The gall ducts opened into the duodenum about one inch and half from the pylorus.—J. H.

A. *c.* 776. The cœcum of a seal, dried (*phoc. vitul.*) : it is very small and short, and devoid of vermiform process.—J..H

A. *c.* 777. The whole intestinal canal of a seal, (*phoc. vitul.*) filled with plaster of paris, and arranged so as to demonstrate its general form and dimensions, in which it differs exceedingly from that of carnivorous animals inhabiting the land. It is very narrow, very long, and with the exception of a small cœcal appendix, exhibits little distinction into small and large intestines—the lower bowels differing little in width from those near the stomach.—J. H.

A. *c.* 785. A portion of the small intestine of a whale, (*delphinus diodon*) showing the singular arrangement of the internal surface : the mucous membrane is formed into cells, having somewhat resemblance to a honey-comb : the cells admit the end of a finger, and their mouths are directed towards the anus : there are no villi to be seen.—J. S.

A. *c.* 786. A portion of the large intestine of a whale (*delph. diod.*). The section embraces a portion of the end of the small, and the beginning of the large bowel. There being no cœcum, there is little on the outer surface to mark where the one ends and the other begins ; but internally the diffe-

rence is known by the disappearance of the cells which characterize the mucous membrane of the ilium, (see 785) and the commencement of smoothness by which the interior of the colon is distinguished : the length of tube between this point, and the opening at the anus is very inconsiderable.—J. S.

A. *c.* 789. A section of the small intestine of a porpess, (*deph. phoc.*) injected and everted : there is no cœcum ; the large and small intestines are about equal in width ; and the only mark of distinction between them is the sudden disappearance of the longitudinal folds of the lining membrane of the ilium. The cuticle passes a short way up the rectum and terminates abruptly on the mucous chorion.—J. S.

A. *c.* 791. The anus of a porpess (*delph. phocæna*) : the opening presents itself in the form of a longitudinal fissure in the skin : the rectum leading to it is preserved.—J. H.

A. *c.* 800. The small intestine of an eagle : the mucous membrane is covered with very long, fine and thickly set villi, but is devoid of valvulæ conniventes.—J. S.

A. *c.* 801. A part of the rectum of an eagle, showing large well marked villi—a degree of development of the mucous chorion not to be found in the large intestines of the mammalia. The preparation shows also the rudiments of cœcal appendages, reduced to two very small culs-de-sac.—J. H.

A. *c.* 802. A preparation to serve as a specimen of the cœcal appendages in nocturnal birds of prey : they are very long, wide at their free extremities, and narrow at their junction with the intestine : taken from the screech-owl, (*strix flammea*).—J. H.

A. *c.* 814. The intestinal canal of a barn-door fowl, to show the long, narrow panchreas supported in the fold of the peritoneum which connects together the two first turns of the small intestine.—(See A. *b.* 442.)—J. H.

A. *c.* 815. A portion of the duodenum of an ostrich, to show the long, fine, and numerous villi of the mucous membrane. The biliary ducts open into the intestine within an inch of the stomach.*—(See prep. 443.)—J. H.

* In an ostrich lately dissected at the College of Surgeons, the relative lengths of The small and large intestines were as follows.

From the stomach to the cœca, 17 feet.
From the cœca to the cloaca, 28 feet.
The length of each cœcum, 2½ feet.

In the Leçons d'Anatomie Comparée, T. 3. p. 469, the Baron Cuvier has stated, that in all birds the portion of intestine between the insertion of the cœca and cloaca is shorter than that between the cœca and stomach ; and in the tables of the comparative lengths of the large and small intestines, (p. 456) has left a blank in the measurement opposite the ostrich's name, showing evidently, that he was unacquainted with the fact, that the ostrich offers a striking exception to the rule laid down by him.—J. H.

A. *c.* 816. One of the cœca of an ostrich everted and preserved in spirits. It is 2½ feet long, and wider near the root than the free extremity. A continuous spiral valve traverses the wide part, the narrow portion is smooth and devoid of any projections of the mucous membrane. Another, a dry preparation, marked with the same number gives a view of the valve as it lies in the interior of the gut when distended by inflation.—J. H.

A. *c.* 817. A portion of the large intestine of an ostrich inflated and dried, showing numerous internal valves, thickly placed together, occupying by their attachments better than half the circumference of the canal, and alternating so as to go round the surface, but not formed of a continuous valve as in the cœcum.—J. H.

A. *c.* 818. A portion of the small intestine of an ostrich prepared by inflation and drying. There is a valvular arrangement internally differing both from that in the cœca and large intestine.—J. H.

A. *c.* 820. A piece of small intestine from a curlew (*scolopax arquata*). There are no valvulæ conniventes; the villi are indistinct; on close inspection the surface of the mucous membrane may be seen covered by numerous zigzag, parallel, whitish lines running spirally around the tube.—J. S.

A. *c.* 821. A piece of small intestine from a curlew, dried, and prepared to show the diverticulum—the remains of the tube by which, during fœtal life, the yolk of the egg found admission into the cavity of the gut to nourish the growing animal. This diverticulum is particularly large in the curlew.—J. H.

A. *c.* 822. The large intestine of a curlew. A defined line marks the limit between the small and large intestines, and two cœca are connected with the latter near the anus.—J. H.

A. *c.* 823. The small intestine of a spoonbill (*platalea leucorodia*). The mucous membrane is smooth and without valvulæ conniventes; the villi are long, fine and numerous.—J. S.

A. *c.* 824. The intestinal canal of a heron (*ardea major*) inflated and dried. The œsophagus is very wide and long; the intestine exceedingly narrow and short; the cœcal appendages very small.—J. H.

A. *c.* 831. A piece of small intestine from a wild swan (*anas cycnus*) injected. There are abundance of villi on the mucous surface, but no valvulæ conniventes.—J. S.

A. *c.* 832. A preparation in plaster of paris, showing the form and dimensions of the digestive tube of the wild swan. The entire length of the tube from the mouth to the anus is preserved: the gizzard—the separate entrances of the

hepatic and cystic ducts into the intestine at a considerable distance from the gizzard—the bursa Fabricii, and the cœcal appendages are all demonstrated.—J. S.

A. *c.* 833. Intestinal canal of a tame swan (*anas cycnus*). In form and arrangement, the tube resembles that of the wild bird ; (see A. *c.* 832) but, as to size, the dimensions of the canal, considerably exceed those exhibited in the preparation of the wild animal.—J. H.

A. *c.* 834. A piece of small intestine in a diver (*columbus immersus*). In this bird which lives on fish, the glandulæ aggregatæ are highly developed, but there are no valvulæ conniventes, and the villi are short and indistinct.—J. S.

A. *c.* 835. The large intestine of a diver (*col. immers.*) injected, and prepared to show the villous and vascular state of this part of the bowel and cœcal appendages.—J. S.

A. *c.* 836. The stomach and intestines of a gannet (*anser basanus*). The stomach is like that in carnivorous birds formed of a thin stratum of muscular fibres attached to two small silvery tendons, one on each side of the organ. The intestines are long : a single small cœcal appendix marks the line between the small and large intestine, the latter of which though shorter, is considerably wider than the former. J. H.

A. *c.* 837. The intestinal canal of the ospray, or sea eagle (*falco haliætus.* L.) filled with plaster. There is a slight dilatation, with considerable glandular development occupying the place of a crop : the œsophagus and stomach are of nearly the same width : the intestine is several feet long, and is widest near the stomach, but in no part from the duodenum to the cloaca is the tube bigger than a crow's quill : there are no cæca, and no marks of distinction into small and large intestines.—J. S.

A. *c.* 840. A section of the small intestine of a turtle, (*testudo mydas*) succesfully injected. The villous or glandular structures are not discernible by the naked eye. The surface of the mucous membrane is formed into delicate serpentine plicæ, interwoven with each other in such a manner as to give to the interior of the gut a singular reticulated appearance.—J. S.

A. *c.* 841. A transverse section of the small intestine of a turtle, (*test. myd.*) showing the prodigious thickness of its tunics compared with the small size of its cavity. —J. S.

A. *c.* 842. The large intestine of a turtle. This part of the canal is short ; the mucous surface is smooth ; a circular sphincter marks the line between it and the small intestine.

A. *c.* 843. A piece of the peritoneum of a turtle covering the stomach, showing the black tinge with which it is stained.

A. *c.* 845. This preparation shows the entire length of the intestinal canal of a tortoise, filled with plaster of paris. The length and subdivisions of the tube may be well understood from an inspection of it. The urinary bladder is shown attached near the anus; it is singularly large and thin, and constricted about the middle.—J. S.

A. *c.* 846. A piece of fat taken from the edible turtle (*testudo mydas*). It is soft and of a greenish colour.—J. H.

A. *c.* 860. A section of the small intestine of an alligator (*lacerta alligator*). The mucous membrane is covered universally with small lozenge shaped spaces, formed by numerous fine linear projections of the surface.—J. H.

A. *c.* 863. A section of the peritoneum of an alligator (*lacerta alligator*) preserved so as to show the black tinge in its colour.—J. H.

A. *c.* 864. This preparation shows a broad strong muscle which in the alligator arises from the pubic bones, and ascends enveloping all the abdominal viscera to be inserted into the spine, and also into the fibrous sheaths of the liver, stomach and heart.—J. H.

A. *c.* 874. A specimen of fat from the abdomen of a *boa-constrictor*. It is white and firm, and disposed in large flattened cakes, distinct from each other, and enclosed in cells of cellular membrane. Packets of cakes like those in the preparation occupied both sides of the spine, from the neck to the tail, packed together inside the ribs, and covered over by peritoneum : a large artery and vein ran along the surface on each side under the peritoneal membrane, and distributed its branches through the cellular texture supporting the cakes of adipose substance. This superabundance of fat is supposed to serve as nutriment to the animal while lying during the winter in a lethargic state : it is said that at the approach of the hybernating season the fat exists in great abundance in the animal, and that towards the close of that period it has nearly all disappeared.—J. H.

A. *c.* 875. A specimen of the fat of the abdomen of a rattlesnake (*crotalis horridus*). Its appearance and uses are much the same as those noticed in the description of that in the boa-constrictor.—J. H.

A. *c.* 900. The intestinal canal of a dog-fish (*squalus caniculus*) showing its internal appearance from the pylorus to the anus : this part of the alimentary tube is not one-fourth the length of the animal, but the extent of the mucous sur-

face is vastly increased by the peculiar disposition of the interior: a marked projection in the form of a spiral valve traverses the cavity from the pylorus to the anus, covered by the mucous membrane and numerous long fine villi, which are rendered conspicuous in the preparation by a successful injection of the surface; the exterior of the tube is smooth, and exhibits no appearance of division into large and small intestines. (see 901.)—J. S.

A. *c.* 901. The intestines of a dog-fish (*sq. canic.*) giving a different view of the spiral valve from that exhibited at A. *c.* 900. A section carried spirally around the gut between the attachments of the valve, has loosened the valve at its peripheral border, and left it hanging by a kind of central pillar, around which it has the appearance of being coiled: the length of the intestine has been greatly increased by this mode of demonstrating the valve. The preparation is beautifully injected.—J. H.

A. *c.* 902. The intestinal canal of an angel-shark. (*spualus galeus.*) The entire length of the canal is preserved and exhibited, with the exception of the cloaca which may be found at F. *b.* 262. It is traversed by a spiral valve from end to end, which gives considerable increase of surface to the mucous membrane beyond what it would have by simply lining so short a tube. The entrance of the biliary ducts into the duodenum near the pylorus is shown in the preparation.—J.H.

A. *c.* 913. A piece of intestine from a sturgeon (*acipenser sturio*) successfully injected. The commencement of the spiral valve of the mucous membrane from a nipple like opening near the pylorus is made evident; a slip of whalebone points out the spiral tract down the tube of the gut, which the aliment is obliged to travel in its descent.

A. *c.* 914. A portion from the lower part of the intestine of a sturgeon, showing the termination of the spiral valve, the beginning of which is shown at A. *c.* 313. The singular reticulated condition of the mucous membrane ceases with the termination of the valve.—J. H.

A. *c.* 915. A section from the intestine of a sturgeon (*acip. stur.*) highly injected, and so put up as to demonstrate the singular, and beautifully areolated state of the mucous surface.—J. H.

A. *c.* 916. A transverse section from the intestine of a sturgeon, prepared to shew the remarkable thickness of the tunics of the gut, and small size of its cavity.—J. H.

A. *c.* 917. A part of the intestinal canal of a frog-fish (*lophius piscatorius*). The entire length from the stomach to

the anus is about four feet ; the canal is small and of nearly the same diameter throughout : the mucous membrane presents numerous areolæ the principal lines of which are longitudinal. The commencement may be seen at A. *b.* 536, the termination at F. *a.* 107.—J. H.

A. *c.* 930. The duodenum of a haddock (*gadus æglifinus*). There are numerous appendages which open by six mouths at a short distance from the pylorus.—J. S.

A. *c.* 935. The stomach and intestines of a mackarel (*scomber scombrus*) filled with wax to shew the form and extent of the tube, together with the long and numerous pyloric appendages.—J. H.

A. *d.* 960. The liver of a human fœtus about the sixth mouth of utero-gestation, preserved in spirits.—J. H.

A. *d.* 961. The liver of a human fœtus at the seventh month. There is little difference in size between the right and left tubes.—J. H.

A. *d.* 962. The liver of a child aged six years without a gall bladder. The abdominal viscera were all perfectly healthy ; the gall bladder was wanting as is manifest from the preparation which shows the liver to be smooth and covered with peritoneum in the place where the gall bladder is usually situated. The stomach and duodenum are preserved in the preparation, to show the opening of the hepatic duct into the latter at its natural place. The contents of the intestinal canal were of the usual consistence and colour ; and the body of the child was fat and perfectly formed. The history is unknown, the case being found accidentally in the anatomical theatre.—J. H.

A. *d.* 968. The thymus, and thyroid glands of a human fœtus at the sixth month of utero-gestation : the tongue, the heart and the lungs are preserved to show the great proportion which the glandular bodies bear to the other organs at that period of embryo-existence.—J. H.

A. *d.* 969. The thymus gland of a human fœtus at the period of birth. It is very large, divided into two lateral lobes, and broader at the inferior than at the superior extremity.—J. H.

A. *d.* 971. A gall bladder taken from the healthy liver of an adult male subject found in the theatre of anatomy. It is the size of an almond, with thick coats and small cavity : the cystic duct bears a proportionate calibre, and both one and other were filled with yellow viscid bile. There was no appearance of disease either in the gall-bladder, ducts or neighbouring parts. The ductus hepaticus and ductus com-

munis choledocus were of the natural structure and dimensions.—J. H.

A. *d.* 980. The liver of a monkey (*simia sabæa*). It resembles in form that of man, with the exception that the lobules are more numerous and deeply divided by fissures. It is furnished with a gall bladder.—J. H.

A. *d.* 990. The liver of a bear (*ursus americ.*). It is divided by deep fissures into five lobes : it has no gall bladder.—J. H.

A. *d.* 994, 995. The thyroid glands of two bears (*urs. amer.*). The gland consists of two distinct lobes, unconnected with each other, and placed one on each side of the trachea. The larger of the two preparations belonged to the younger animal.—J. H.

A. *d.* 996. A plaster cast of the liver of an otter (*lutra vulgaris*). The organ is furnished with a gall bladder ; its lobes are seven in number; and the fissures dividing them, run deeply into the substance of the organ.—J. H.

A. *d.* 997. The liver of a mole (*talpa Europea*) shown in its place in the abdomen. It has three lobes and a gall bladder.—J. H.

A. *d.* 998. The liver of a jackall (*canis aureus*). It consists of four lobes separated by deep sulci ; and is provided with a gall bladder.—J. H.

A. *d.* 999. A cast of the liver of a wolf (*canis lupus.*). It has a gall bladder, and seven well distinguished lobes.—J. H.

A *d.* 1000. The gall bladder of a lioness (*felis leo*) inflated and dried. It is pyramidal and the cystic duct is much convoluted.—J. S.

A. *d.* 1001. A cast of the liver of a coati mundi (*viverra nasua*). It has five lobes and a gall bladder.—J. H.

A *d.* 1016. The liver of a guinea pig (*cavia*). It is large in proportion to the size of the animal. It consists of two large lobes, with an intermediate small one seen only on the inferior surface. There is no gall bladder.—J. H.

A. *d.* 1917. A cast of the liver of an agouti (*mus agouti*). It presents three large lobes and a small one, but is devoid of bladder.—J. H.

A. *d.* 1030. The liver of a fœtal calf (*bos taurus*). It is divided into two lobes by a fissure somewhat less marked than that of the human liver : it is furnished with a gall bladder.—J. H.

A. *d.* 1031. A cast of the liver of a dromedary (*camelus dromedarius*). It is divided into two lobes, and presents a considerable eminence on the under surface of the right lobe in the site of the lobulus spigelii. Many small whitish tuber-

cles, with which the organ in common with the lungs of the same animal was the seat, are represented in the cast. It is an instance of a liver without any gall bladder.—J. H.

A. *d.* 1032. The liver of an alpacca (*camelus lama*). It resembles that of the dromedary in being divided into two lobes, and in being devoid of gall bladder.—J. H.

A. *d.* 1035. The thymus gland of a fœtal calf, in connection with the pericardium and wind-pipe. The gland is divided into two lateral pieces, larger below where they unite, than above where a considerable space separates them : its size is very considerable, extending along the trachea from the pericardium to the os-hyoïdes : it is of a white colour, and consists of numerous lobules of various sizes joined loosely by cellular membrane.—J. H.

A. *d.* 1044. The liver of a seal (*ph. vitulina*). It is furnished with a gall-bladder, and is divided by deep sulci into six lobes.—J. H.

A. *d.* 1046. The liver of a seal, showing the peculiarities of its circulating vessels—see B. *c.* 379.—J. H.

A. *d.* 1050. The liver of a young porpoise, injected (*delphinus phocæna*). In form it bears close resemblance to the liver of a human fœtus, having two lobes separated on the inferior surface by a shallow horizontal fissure. It differs, however, in being without gall bladder.—J. S.

A. *d.* 1060. The liver of an ostrich (*struthio camelus* It is nearly the size of the human liver : it is divided into two lateral lobes by a fissure, which traverses more than half its substance : a second fissure of less depth makes a partial subdivision of the left lobe into two. There is no gall bladder, and the hepatic duct opens into the duodenum separately from the panchreatic. The opening of the hepatic duct about half an inch from the stomach is shown at 443. 815.—J. H.

A. *d.* 1061. The liver of a cormorand (*pelicanus carbo*). The organ is large in proportion to the body of the animal : it consists of two lobes of which the left is somewhat larger than the right: it is provided with a gall bladder, into the bottom of which some small biliary ducts derived directly from the liver are shown to enter.—J. H.

A. *d.* 1062. The liver and a portion of the small intestine of a parrot, showing the absence of gall bladder, and the separate entrances of the two biliary ducts into the intestine.

A. *d.* 1070. A portion of the liver of a turtle (*testudo mydas*) showing the gall bladder nearly encompassed by its substance.—J. H.

A. *d.* 1075. The liver of a young alligator (*lacerta alli-*

gator). There is no gall bladder : a deep notch, into which the heart is received, divides it into two lobes.—J. S.

A. *d.* 1076. The liver of an alligator uninjected, showing the natural colour of the organ ; its want of gall bladder ; and subdivision into two lobes by a large notch.—J. H.

A. *d.* 1080. The liver of a rattlesnake (*crotalis horridus*). It is long and narrow, and larger at one end than the other : the vessels enter it at one side ; the ducts emerge from it at the small extremity : the gall bladder may be seen at A. *b.* 501 : the ducts are numerous and small, and in making the dissection, when examined with a magnifying glass, were seen to open—some into the gall bladder, some into the ducts of that bag, and others into the duodenum without having any communication with either of the former : all the ducts, however, before disappearing, traversed the centre of the panchreas, a hard rounded substance lying close upon the intestine ; the peritoneum covering the liver is of a blackish hue.—J. H.

A. *d.* 1081. The liver of a viper. It is divided into two lobes : the gall bladder is placed at some distance from the organ : the hepatic and cystic ducts unite near the pylorus where they are enveloped in a small glandular body, supposed to be panchreas.—J. S.

A. *d.* 1092. The liver of a *boa-constrictor*. It is long and narrow, resembling in form the liver of the rattlesnake.—J. H.

A. *d.* 1091. The liver of a ray (*raja batis*). It is pale, soft, divided into three lobes, and devoid of gall bladder.—J. H.

A. *d.* 1022. A cast of the liver of a torpedo ray (*raja torpedo*). The organ is large, and divided into two equal parts, distinct from each other and separated by a considerable interval : two large ducts, one from each lobe, unite and enter into a common gall-bladder.—J. H.

A. *d.* 1093. The liver of a lamprey eel (*petromyzon fluviatilis*). It is long, narrow, and single lobed. The heart and intestinal tube are shown in the preparation : the cavities of the heart are laid open ; the intestine is small and short, and takes a straight course through the abdominal cavity.—J. H.

A. *d.* 1094. A plaster cast of the liver of a sturgeon (*acipenser sturio*). It consists of two lobes of nearly equal size, and singularly waved shape.—J. H.

A. *d.* 1095. The liver of a miller's thumb (*cottus gobio*). The heart is shown attached to the upper part of the preparation.—J. H.

A. *d.* 1096. The duodenal appendages of a mullet (*megil cephalus*). Much variety exists in regard of the number, and

magnitude of these cœca in different fish. Some of those varieties are exhibited at prep. A. *b.* 525, 526 *et seq.* The analogy between those appendages and a glandular structure resembling a panchreas found in some fish, has led to the placing of this preparation under the order of " Glands connected with digestion."—J. H.

A. *d.* 1097. The panchreatic gland of a sturgeon (*acip. sturio*). It is a large, oval, flattened body joined by a short, wide duct to the duodenum : the mucous membrane in the interior of the duct and all through its wider ramifications possesses the same reticulated character as that which lines the intestine. The examination of this organ is interesting in connection with an enquiry into the structure and functions of the blind appendages of other fish occupying the same situation. Some fish are devoid of such appendages altogether : some have only one, others have two, three, and so on, increasing up to a considerable number, all of which lined by mucous membrane join their tubes together, and open by a common mouth at the pylorus. The organic structure of the panchreatic body in the sturgeon differs only from these cœcal appendages in having the blind extremity of its tubes subdivided more minutely, more firmly cemented together, and enveloped more completely in one common peritoneal tunic. The tubular appendages of other fish are, in the case of the sturgeon, transformed by a simple intelligible modification into a perfect gland.—J. H.

A. *d.* 1110. The liver of a cuttlefish (*sepia officinalis*). It makes a very large, soft mass in the abdominal cavity : it is oblong, oval, of a yellowish brown color and divided into two lateral lobes. There is no gall bladder. The ink-bag in this animal lies far back in the abdomen and has no connection with the liver.—J. H.

A. *d.* 1111. The liver of a poulpe (*sepia octopodia*), showing the ink-bag lying between the lobes and in close connection with the structure of the organ*.—J. H.

A. *d.* 1112. The liver of a calmar (*sepia loligo*). The aorta, œsophagus, and rectum all run through its substance : the ink-bag lies in front of the liver near the funnel through which the ink and fæces are discharged, but has no direct connection with the organ. Owing to the soft and oily nature of the liver in the cephalopodous mollusca, it is difficult to make a satisfactory exhibition of its structure.—J. H.

* An observation of the close connection between the ink-bag and liver in the sepia octopodia, led Monro to adopt the erroneous opinion that the peculiar ink of these animals was nothing else than the bile.

A. *a.* 1120. A garden snail (*helix hortensis*) deprived of its shell so as to exhibit the liver, which as to form and size corresponds in some measure to the cavity in the upper convolutions of the shell, in which it lies loosely.—J. H.

A. *d.* 1125. A scallop in its shell (*ostrea maxima*). The liver is very large, and closely envelopes the stomach and intestinal canal.—J. H.

A. *d.* 1135. The hepatic organ of a crab (*cancer mœnas*). The mass is so large as to fill the cavity of the thorax: it is soft, spongy, and of a yellow colour, and composed of a vast quantity of small, blind tubes, which open like those forming the panchreatic organ in fishes into the commencement of the small intestine. It is this structure which gives the peculiar bitter taste to the crab.—J. H.

A. *d.* 1136. The body of a large scorpion laid open to exhibit the intestinal canal; the corpus adiposum, a representative of the liver; and the biliary vessels. The intestinal canal may be seen running in a straight line down the centre of the body: the two lateral lobulated masses which occupy the whole abdominal cavity constitute the adipose body: several small tubes pass transversely on each side from this peculiar structure to the intestinal canal, and discharge therein a fluid said to have the properties of bile.—J. H.

A. *d.* 1140. The liver of a star-fish (*asteria rubens*). The organ in this animal consists of five double rows of biliary lobules, placed, one in the cavity of each arm, and from which a common duct carries the secretion to the central digestive cavity. The rows of lobules should not be confounded with those of the ovaria, which have somewhat a like form and locality.—J. H.

B. *a.* 1. Lacteals on the human intestine, filled with quicksilver. The size, the form, and the course of these vessels may be well understood from an examination of this preparation.—J H.

B. *a.* 2. Lacteals on the human intestine distended with chyle: the vessels are more enlarged than it is usual to find them. They have been stripped of the peritoneal covering to render them more visible.—J. S.

B. *a.* 3. This preparation shows the orifices of several lacteals on the mucous membrane. The chyle with which they are distended gives to the orifices a dotted white appearance.—J. S.

B. *a.* 4. The trunk and several ramifications of a lacteal vessel on a portion of the mesentery and intestine of the

human body : they are rendered turgid and conspicuous by being filled with white chyle—J. S.

B. *a.* 5. Lymphatic vessels on the human liver, filled with quicksilver. The trunk with its branches have an arborescent arrangement.—J. S.

B. *a.* 6. In this preparation a few of the superficial lymphatics of the liver are injected with quicksilver.—J. S.

B. *a.* 7. A dried preparation of a human gall bladder, showing the ramifications on its surface of several lymphatics injected with quicksilver.—J. H.

B. *a.* 8. Lymphatic vessels of the lower extremity of the human subject injected with quicksilver. This is a most valuable preparation. It shows the origin of many lymphatics on the dorsum of the foot, their course up along both sides of the leg, their anastomoses with each other, their connection with the inguinal glands, and their exit from these glands as vasa efferentia.—J. S.

B. *a.* 9. A number of full length lymphatic vessels of the lower extremity of a human subject, injected with mercury. They have been removed from the limb, spread out on a dark coloured board, and dried —J. H.

B. *a.* 10. An inguinal lymphatic gland, with its vasa inferentia and efferentia injected with quicksilver, and placed on blue paper. The vessels entering the gland are numerous and small, compared with those leaving it, which are very few in number, and of considerable dimensions.—J. H.

B. *a.* 11. A few inguinal lymphatic glands, with the corresponding vasa inferentia and efferentia injected with quicksilver, and put up in a bottle of turpentine.—J. S.

B. *a.* 12. A quicksilver injection of the lymphatics of the right lower extremity : the vessels are exhibited in great numbers in the groin, along the thigh, down the leg, and even on the dorsum of the foot, as far as the toes.—J. H.

B. *a.* 22. The mesenteric glands of a lion (*felis leo*). They are large, few, and collected into a cluster.—J. H.

B. *a.* 23. The lacteal vessels on the intestine and mesentery of a dog, filled with chyle : a noose tied around the mesentery immediately after death prevented the escape of the chyle from the vessels.—J. S.

B. *a.* 24. The lacteal vessels on the mesentery of a dog filled with quicksilver, dried, and varnished.—J. S.

B. *a.* 25. The lacteal vessels on the mesentery of a badger (*ursus meles*), prepared by injection with quicksilver and drying.—J. H.

B. *a.* 30. This preparation shows a few of the lymphatics

of the testicle and spermatic chord of a rabbit, injected with quicksilver.—J. S.

B. *a.* 37. The mesenteric gland of a coati mundi (*viverra nasua*). All the lacteals of the intestines pass through this solitary gland.—J. H.

B. *a.* 32. Two lymphatic glands with their vasa inferentia from the neck of the opposum (*didelphis virgineana*). At the time of removal from the body they were filled with their own lymph, which, when first exposed, was perfectly limpid, but on being immersed in spirit, acquired an opaque reddish colour.—J. S.

B. *a.* 36. Lymphatics of the testicle and spermatic chord of a horse, filled with quicksilver : their size is almost incredible. The spermatic arteries are filled with red, the veins with yellow wax.—J. S.

B. *a.* 37. The lacteals on the mesentery of a horse filled with quicksilver. Between 60 and 70 vessels have been injected on a portion of mesentery of small extent. The arteries have been made red, the veins yellow.—J. S.

B. *a.* 38. A most successful injection of the lacteals on the mesentery of a horse. Although the entire surface of the preparation is only between two and three feet in extent, eighty lacteal trunks have been filled with mercury from about 120 branches, into most of which the injecting pipe was introduced at points on the surface of the intestine. The arteries and veins are injected with red and blue wax.—J. H.

B. *a.* 39. A quicksilver preparation of the lacteals of a peccary (*dicotyles torquatus*—Cuv.) The lymphatics are very numerous and injected to the very margin of the intestine. The arteries and veins are filled with wax.—J. H.

B. *a.* 44. A portion of the liver of a calf with several lymphatics injected with quicksilver : they are very large, and anastomose freely with each other. Some of the deeply seated vessels are observable.—J. S.

B. *a.* 45. The heart of a rein-deer (*cervus tarandus*) showing the superficial lymphatics injected with quicksilver. They run in the course of the coronary arteries, and observe an arborescent form of anastomosis.—J. S.

B. *a.* 46. Lacteals on the mesentery of the nylgau (*antilop. picta*) injected with quicksilver : the trunks are few and course along the mesentery, by the side of the artery and vein. The preparation is dried and varnished.—J. S.

B. *a.* 47. The lymphatics of the testicle and spermatic cord of the nylgau injected with quicksilver.—J. S.

B. *a.* 53. The mesenteric gland of a seal (*phoca vitulina*).

This large oblong body is placed at the root of the mesentery, and is traversed by all the lacteal vessels, on their way from the intestines to the thoracic duct.—J. H.

B. *a.* 60. The lacteals and glands on the mesentery of a whale (*delphinus diodon*). There are two preparations of the same kind marked by this number, both most successful quicksilver injections. The smaller branches of the lacteals on the intestine, and in connection with the ramifications of artery on the mesentery near the intestine, are very numerous: the trunks formed by the union of these branches are few, and run in company with the artery and vein to the root of the mesentery, where they are shown to enter several distinct well injected lymphatic glands. The size of the lymphatic trunks shown here is small in proportion to that of the blood-vessels.—J. S.

B. *a.* 61. Thoracic absorbents of a whale (*delphinus diodon.*) The preparation exhibits an enormous congeries of lymphatic trunks, filled with plaster of paris, lying along the vertebral column, and surrounding the aorta in the situation of the thoracic duct.—J. S.

B. *a.* 71. A piece of small intestine from an alligator (*lacerta alligator*), showing several lacteal orifices on the mucous surface filled with chyle.—J. S.

B. *a.* 72. A preparation showing the lacteals on the intestine and mesentery of a turtle (*testudo mydas*) successfully injected with quicksilver. The ramifications, which are very numerous, were all filled from a tube introduced into one of the trunks—the mercury having flowed in a retrograde direction from trunk to branch. The arteries are red, the veins yellow: a dry preparation.—J. S.

B. *a.* 73. Lacteals on the mesentery and small intestine of a turtle. The arteries are red, the veins are blue, and the lacteals are to be distinguished by the quicksilver which fills their tubes. This is a wet preparation preserved in spirits.—J.S.

B. *a.* 74. A portion of small intestine from a turtle, on which the lacteals have been injected with quicksilver: an abundant net work of them is observable under the mucous membrane, but none of their orifices on the surface are discernible.—J. S.

B. *a.* 75. Lymphatics on the surface of the lung of a turtle (*testudo mydas*). They are large, numerous, and by their frequent anastomoses form a complete net-work on the surface.—J. S.

B. *b.* 81. Dissection of the human heart. The several cavities have been laid open after distension and hardening

in spirits, and their interior conformation thereby well and naturally displayed. In the right auricle, the openings of the venæ cavæ and vena coronaria, the auriculo-ventricular passage, and the fossa ovalis, together with the tuberculum Loweri, the musculi pectinati, &c. are all demonstrated. The section which has been made of the right ventricle exposes to view the relative position of the auriculo-ventricular opening in reference to that leading into the pulmonary artery, together with the valves of these openings : it also shows the carneæ columnæ, the septum ventriculorum, &c. The left auricle has been laid open by an incision across the posterior wall by which the four corners of the bag and the passage downwards from it into the ventricle are made evident : there are no valves here, and the musculi pectinati are fewer and less prominent than those in the right auricle. In the same view the interior of the left ventricle is exhibited by an incision carried perpendicularly downwards : the conformation of the mitral valves ; the strength of the carneæ columnæ ; and the great thickness of the walls of the ventricle may be all well appreciated from the demonstration here given.—J. H.

B. *b*. 82. A model of the cavities of an adult human heart. In making this preparation the cavities of the heart and its great vessels were first filled with coloured wax ; the entire was then immersed in diluted muriatic acid, and after some time, when the flesh was corroded and removed by ablution in water, the wax bearing the form of the interior of the auricles, ventricles, and great vessels was dried and varnished.—J. S.

B. *b*. 83. This is a beautiful little preparation of the heart of a child prepared in the same manner as that at B. *b*. 82. It exhibits not only a perfect model of the cavities of the heart in red and black wax, but also that of the pulmonary vessels and tubes as they are ramified through the substance of the lungs.—J. S.

B. *b*. 84. A model of the cavities and great vessels of the adult human heart, prepared in the same manner as that described at B. *b*. 82. This preparation is particularly instructive, The right or pulmonic cavities of the heart were filled with black wax, the left or systemic with red, and after the removal of the flesh by acid, the two models—the black and the red—were separated, preserving each their proper shapes, and capable of being rejoined so as to exhibit by their union the perfect double heart. The black may be regarded as analogous to the single pulmonic heart of fish, the red one may be taken as a specimen of the kind of heart posses-

sed by some mollusca—the snail, for example; and the two when placed together demonstrate the character of the organ as found in mammalia and birds, when arrived at the period of full growth.—J. H.

B. *b*. 85. The heart of a human fœtus about the seventh month of utero-gestation. The auricles are both opened: one piece of whalebone may be seen to occupy the passage from the inferior vena cava through the foramen ovale into the left auricle; another piece lies with one end in the superior vena cava, and with the other rests in the right auriculo-ventricular opening: the pulmonary artery is laid open by an incision extending along its fore part into the ductus arteriosus: the openings of the right and left branches of the artery may be seen through the incision, and a view thereby had of their magnitude as compared with that of the ductus arteriosus.—J. H.

B. *b*. 86. The heart and lungs of a fœtus at the third month, taken from the fœtus of which the skeleton may be seen at E. *a*. 11. Viewed externally it is a perfect miniature of a full-grown heart; the auricles, ventricles, and great vessels are all distinguishable, and bear the usual relative position to each other, and nearly the same comparative dimensions: the cavities have not been cut open. The connection of the lungs to the sides of the heart, their subdivision into lobules, and envelopement by a fine serous covering are all perfectly discernible.—J. H.

B. *b*. 87. The heart of a child about two years old, prepared in the manner described at 81, and exhibiting the anatomy of the youthful heart, as compared with that of the adult. The dissection has been so managed that all the cavities, passages, valves, may be seen at one view.—J. H.

B. *b*. 88. This preparation shows the mode of operation of the valves of the aorta in preventing regurgitation of blood from the artery into the heart. The valves are laid down over the mouth of the vessel, and the contact of their margins with each other is shown to be so complete that in attempting to look between them the light cannot be discerned.—J. S.

B. *b*. 90. A preparation showing a very unusual arrangement of the valves of the aorta in the human body: there are four distinct and perfect valves, instead of three, the ordinary number. No deviation from the ordinary state was observable in any other part of the organ.—*Prof. Kirby's collection.*

B. *b*. 91.—A preparation in which the same irregularity

exists in the valves of the pulmonary artery, as that shown in the aortic valves at 90. The heart was that of a middle aged woman, and in all other respects was perfectly natural and healthy.—J. H.

B. *b*. 92. The heart of an adult human subject, in which the superior vena cava discharged itself by two trunks into the right auricle: these trunks are of nearly equal size, and open close to each other into the upper part of the auricle.—J. H.

B. *b*. 93. The heart of an adult human subject, with the foramen ovale open. The aperture is very wide—the valve being not more than one-third the breadth of the opening. Both auricles appear larger than natural;—the other parts of the heart are sound; no history of the case.—J. H.

B. *b*. 94. A magnificent preparation of the heart and blood-vessels of an adult human subject, injected and removed from the body. The venous system and right side of the heart are filled with black injection—the arterial system and left cavities are distended with red injection. The heart and vessels though separated from all the other textures of the body, have been so arranged as to preserve their relative position with respect to each other, and to exhibit the outline of the body by its vascular system. The heart appears in the centre: the ramifications of the blood-vessels in the lungs, and their connection with the respective sides of the heart are preserved. The relative anatomy of the vessels passing upwards from the heart—the cava, aorta, and pulmonary artery are well exhibited. The course of the carotid, its position in reference to the jugular vein, and the distribution of its branches to the exterior and interior of the skull, the arch which the subclavian artery forms, the relation which it holds to the subclavian vein, and its termination in the branches of the forearm, may be all seen at one glance. Leading downwards from the heart, is the thoracic and then the abdominal aorta with their visceral branches, and corresponding veins: next the common iliac vessels, and lastly the internal and external iliacs with a considerable portion of both femorals. The thoracic duct, in this instance subdivided into several trunks, has been injected with white paint. Its commencement in the receptaculum chyli, its course along the side of the aorta, and its termination in the left subclavian vein are all satisfactorily demonstrated.—J. S.

B. *b*. 95. The heart and principal arteries of an adult human subject. The pulmonary heart and veins have been injected with yellow—the systemic heart and arteries with red wax.

A part of the bony parietes of the chest have been preserved to shew the position of the circulating organs in the cavity ; and a portion of the uppermost bone of the sternum with the clavicle attached has been left in its place to exhibit the exact relative position of the vessels in the superior aperture of the chest. The diaphragm has been also retained to show the passages for the transmission of the aorta and cava.—J. H.

B. *b.* 97 The heart of a child in which the septum ventriculorum is imperfect. The following is the history of the case by Dr. Graves, see Dub. Hosp. Reports, vol. 5.

" Patrick Sullivan, aged three years, was admited into the Meath Hospital on the 21st of May, 1829. He laboured under evident symptoms of tubercular cavities in the lungs and of bronchitis. The case was remarkable for the violence of the heart's action, compared with the feebleness of the pulse and coldness of skin. The face, hands, and feet, were of a dark livid hue, such as occurs in morbus cæruleus from malformation of the heart. On inquiry it appeared that this colour had not been habitual, *and only came on when he laboured under pectoral affections* : we were not able to learn whether violent exercise used to produce the same effect.

" He died in two days after his admission, and on dissection, besides bronchitis, tubercular cavities, and infiltration of the lungs, the heart was found malformed."

The right auricle was large, foramen ovale closed, the fossa ovalis unusually small, being only two lines in the vertical, and a line and half in the transverse direction. The tricuspid valves were of perfect formation. The pulmonary artery was about half the usual size, and furnished with two semilunar valves. A defined smooth hole sufficiently wide to admit the little finger, and situated between the two last described openings, led from the right ventricle, through the septum, into the upper part of the left ventricle: this passage was twice as wide as that leading into the pulmonary artery. The left auricle was small, the left ventricle of the same size and thickness as the right, and the aortic valves were perfect. The aorta was unusually capacious, and the ductus arteriousus diminished in size, but not obliterated.—J. H.

B. *b.* 98. The heart of an infant with imperfect septum. The infant son of a medical gentleman became convulsed and livid after its birth ; it soon recovered from this state, and during the first six months had no return of such attack ; but never sucked strongly, was languid, inactive, uneasy, and never could bear exercise in the nurse's arms. The veins about the head were permanently enlarged, the face always

livid, and the lips blue. About the sixth month, when teething began, he had several convulsive struggles, one of which terminated in total insensibility and apparent death; he recovered, however, by inflation of the lungs, and the adoption of other means usual in such cases, and gradually returned to his former comparatively healthy state. When eighteen months old, after suffering much from repeated convulsions, he became exhausted, and expired in one of these struggles.

The venæ cavæ and their leading branches were unusually dilated; the heart was larger and firmer than natural; the right auricle was of double the ordinary capacity and thickness, and filled with coagulated blood; its foramen ovale was round and wide, and all its other openings of more than ordinary dimensions. The right ventricle was larger than the left, and almost devoid of columnæ carneæ. The tricuspid valve was perfect; this ventricle had no communication with the pulmonary artery; the passage from it into that vessel was totally blocked up, and in its stead a wide opening led into the aorta, which took origin from this part of the heart.

The left auricle was small and empty. The left ventricle exhibited nothing singular in its size or structure, but *communicated with the right* by an opening in the upper part of the septum ventriculorum, opposite the passage into the aorta. This opening, which was large, round, and smooth, rendered the communication between the right ventricle and aorta, nearly as direct as that between the left ventricle and that vessel. The aorta, at its origin, was much dilated; the innominata, carotid, and subclavian arteries were regular; the ductus arteriosus was large and pervious, and may be looked upon in this case as taking origin from the aorta, inasmuch as it carried the blood from that vessel into the lungs, in the place of the obstructed pulmonary artery, to whose branches it served as a trunk. The pulmonary artery, though inconsiderable, was pervious down to its point of attachment at the ventricle. The lungs were healthy, light coloured, and nearly bloodless. The abdominal and other viscera of the body were perfectly natural and sound.

In the two cases just related, 97, 98, the proper circulation and arterialization of the blood was much interrupted by the unnatural communication between the right and left ventricles of the heart. *In both the state of the circulation bore a remarkable analogy to that in reptiles,* in which the arterial and venous blood are brought together to the same cavity in the heart and transmitted thence mixed equally to both body and lungs.

In the first case, (97) where the deviation from the usual condition of the heart was least exaggerated, viz. where the permeability of the pulmonary artery occurred in conjunction with a communication between the ventricles, the disturbance to the functions was least marked, and the duration of life longest.

In the second case, (98) in which, besides the opening between the ventricles, all transit for the venous blood to the lungs was cut off by the impermeability of the pulmonary artery; the infant was always blue, most easily disturbed, and short-lived. In this case the quality of the blood sent to both the body and lungs were exactly alike, and almost entirely venous; and in both it is worthy of remark, that the system was sufficiently nourished, even with the depraved blood, that the children were easy while the circulation was allowed to be tranquil, and that disturbance and oppression were only manifested when any cause, such as fever or exercise, accelerated the movement of the fluids.—J. H.

B. *b*. 100. A rare specimen of transposition of the heart, and of all the other organs in the human body. The case was that of an elderly woman who died of fever, in the Richmond Fever Hospital: she had been a woman of good constitution, and the mother of several children, but of whose history nothing could be learned. Respecting herself during lifetime, no remarkable circumstance had ever attracted attention, and it was only by accident in proceeding to an examination of the body after decease that the peculiarities of her frame were discovered.

The cavities of the heart are completely transposed; those which customarily lie on the right side occupy in this instance a place on the left, and vice versa those whose natural position is the left, are here found on the right. The pulmonary cavities of the heart are filled with blue, the systemic with red injection: the base of the heart looks upwards and to the left, the apex downwards and to the right, where its pulsation must have struck between the cartilages of the fifth and sixth ribs: the venæ cavæ though so far out of their usual place are of the ordinary size, and formed by the common coalition of venous trunks. The pulmonic auricle and ventricle are here the left cavities, and the pulmonary artery in its course from the upper and right corner of the ventricle to its bifurcation near the roots of the lungs is placed along the right side of the arch of the aorta: the systemic oracle and ventricle are in this instance the right cavities: the aorta makes its arch to the right, and descends in the thorax along

the right side of the vertebral column, and even in the abdomen down to its bifurcation in the iliacs, it holds the same unusual position. The inferior vena cava lies for its whole length to the left of the aorta, and in front of the bodies of the vertebræ. Three arteries arise as usual from the arch of the aorta, but the order in which the extremities receive from them the blood is reversed; the left arm and the corresponding side of the head are first supplied from the arteria innominata; the right side of the neck, and the right arm receive in succession the blood conveyed by the carotid and subclavian arteries, which have separate origins from the arch. The right vena innominata crosses above the arch of the aorta, and joining the left at the left side of the arteria innominata forms with it there the commencement of the vena cava superior.

The œsophagus is placed along the posterior and right side of the trachea. The stomach is shewn lying in the right hypochondrium, and the vessels which supplied the liver in the left. The cœcum occupies the left iliac fossa, and the sigmoid flexure lies in the right, terminating there in the rectum, the position of which as regards the sacrum, is in accordance with the other irregularities. In making the dissection it was noted that the misplacements of the spleen, panchreas, and other organs were of the same character, and equally complete as those exhibited in the preparation.—J. H.

B. *b.* 116. A preparation, showing the heart, pericardium, lungs, and diaphragm of a monkey. These parts are all preserved bearing their natural relations in the cavity of the chest: the attachment of the pericardium to the diaphragm is preserved, showing the resemblance of its arrangement, in this respect, in the monkey tribe to that in the human subject. In the other mammalia, the connection of the base of the pericardium is with the sternum, and not with the diaphragm, as is shown in the preparation marked B. *b.* 141.—J. H.

B. *b.* 117. A dissection of the cavities of the heart of a monkey (*simia sabœa*). The auricles and ventricles, after being distended and hardened with spirits, were cut open in such a manner as to display their structure and interior conformation. The openings, valves, carneæ columnæ, &c. are all exhibited.—J. H.

B. *b.* 118. A driedpreparation of the heart and arteries of a monkey. The description will be found at B. *c.* 361, and the preparation under the same head.—J. S.

B. *b.* 125. A beautiful preparation of the heart of a young

bear (*ursus Americanus*). The interior of all the cavities, the valves, the great vessels, &c. are shown. The heart is round and somewhat broad: the right auricle is moderately fleshy, and its auricular appendix much larger than in the human heart: there is no Eustachian valve, the tuberculum Loweri is very prominent, and the fossa ovalis marked, and perfectly closed: the openings of the superior and inferior venæ cavæ are more approximated than in man. The entire of the cavity of the right auricle is made visible; it appears more dilated than the left; its interior is almost devoid of fleshly columns; the tricuspid valve has three well defined portions, of which two are connected by short chordæ tendineæ to two long and thick fleshy columns, and the third is attached by tendinous chords to the surface of the heart, near the mouth of the pulmonary artery, without the intervention of any fleshy column. The mouth and semilunar valves of the pulmonary artery are exhibited; its division into two branches is also shewn, and of these the left has been cut short, whilst the right has been preserved longer to demonstrate its transverse course behind the arch of the aorta and the vena cava. The left auricle is large and fleshy and connected to the right by the septum. The walls of the left ventricle are three times as thick as the right; its interior presents very few carneæ columnæ. The mitral valve is arranged as in man, its chordæ tendineæ are long numerous and thick, and attached to broad but slightly elevated columns, very unlike those to which the chordæ tendineæ of the tricuspid valve are fixed. The arch of the aorta gives two branches upwards; the first furnishes the right subclavian and both carotids; the second becomes left subclavian.—J. H.

B. *b.* 126. The heart of a full grown bear (*ursus Americanus*) dissected as B. *b.* 125. The anatomy of all its parts is exhibited. There is little difference between it and the heart of the more young animal.—J. H.

B. *b.* 127. The heart of a lioness; a dried preparation: the pulmonic heart has been injected red, the systemic heart yellow. The apex of the left ventricle projects in a pointed form beyond the extremity of the right. Two branches are given off from the arch of the aorta: the first after a short course yields a trunk—the common origin of both carotids, and then continues its course as right subclavian; the second becomes the left subclavian.—J. H.

B. *b.* 128. The heart of a young lioness prepared as B. *b.* 81. and showing the anatomy of all the cavities and passages. It resembles in almost every respect the heart of the young

bear, B. *b.* 125. The tricuspid valve is provided with three long carneæ columnæ, one to each division of the valve, and the cordæ tendineæ are short: the mitral valve, as in the bear, has long cordæ tendineæ with broad flattened carneæ columnæ.—J. H.

B. *b.* 129. The heart of a wolf (*canis lupus*). The cavities are exhibited: the heart is round and little pointed at the apex. The discription given at B. *b.* 125, of the bear's heart is very applicable to this preparation. The auricles are somewhat more fleshy, but in the arrangement of the valves and the disposition of the carneæ columnæ the hearts are very much alike.—J. H.

B. *b.* 130. The heart of a jackall (*canis aureus*). The interior of its cavities is displayed: it is somewhat elongated: there are few carneæ columnæ in the right ventricle, except those of the tricuspid valve, which are two in number: the left ventricle is smooth all over the interior, except on the septum where a few slight elevations are observable: there are no carneæ columnæ, not even for the attachments of the mitral valve. The arch of the aorta furnishes two trunks; the first gives off the right subclavian and the right and left carotids, the second becomes the left subclavian.—J. H.

B. *b.* 131. The heart of a cat (*felis catus*). Every part of its anatomy is displayed. The heart is long and pointed: the auricular appendix is large in both auricles: there are numerous fine carneæ columnæ about the apex and along the anterior wall of the right ventricle, and there are two fleshy columns for the attachment of the tendinous chords of the tricuspid valve, as in the bear. There are very few carneæ columnæ in the left ventricle: and those for the attachment of the tendons of the mitral valve, are more elongated than in the bear (125), lioness (128), wolf (129), or jackall. 130.—J. H.

A. *b.* 132. A corroded preparation of the heart of a dog, prepared as described at B. *b.* 82. The wax representing the pulmonary side of the heart is yellow, that of the systemic compartments is red. The former is considerably larger than the latter: the wax which filled the right auricular process is pectinated, that which occupied the right ventricle is smooth. The impressions of the semilunar valves and the bifurcation of the pulmonary artery are exhibited in the wax. The left auricular process is pectinated, the ventricle smooth and conical.—J. S.

A. *b.* 133. The heart of a mole (*talpa Europea*), in connection with the lungs and diaphragm.. The heart is long and

narrow: its four cavities are opened and exposed. The lung is multi-lobulated, and overlaps the pericardium. The liver is shown beneath the diaphragm, divided into numerous, small, deeply fissured lobules.—J. H.

A. *b.* 138. The heart of a coati mundi (*viverra nasua*). The auricles are thin and small: the right ventricle is large and observes a spiral direction in respect of the left, around which it appears as moulded: the carneæ columnæ of this ventricle are numerous, fine and reticulated; there are three more marked than the others which give attachments to the cordæ tendineæ of the tricuspid valve. The walls of the left ventricle are so thick as to leave little space for a cavity in the interior: the extremity of this ventricle forms a pointed apex to the heart. The arch of the aorta gives origin to two large vessels.—J. H.

B. *b.* 140. The heart and lungs of a marmot (*M. alpinus*). The heart is nearly spherical: its apex turns forwards; the cavities are unopened. Three branches arise from the arch of the aorta, but at a more considerable distance than is usual in mammalia.—J. H.

B. *b.* 141. The heart and lungs of a guinea-pig (*cavia*) in their place in the chest. The preparation is intended to show the attachment of the inferior extremity of the pericardium to the lower and posterior part of the sternum: this attachment may be best seen by looking at the preparation against the light.—J. H.

B. *b.* 142. The heart of a marmot, showing the anatomy of its cavities: the form which is round is well preserved: both auricular processes, projecting from the bodies of the auricles, are large and pectinated. The walls of the right ventricle are thin, and its position with respect to the left oblique, and somewhat spiral: the carneæ columnæ are few, and confined chiefly to the anterior wall. The flesh of the left ventricle is thick, and the carneæ columnæ abundant: the arch of the aorta furnishes one solitary trunk, from which all the branches destined to supply the head and upper extremities are derived.—J. H.

B. *b.* 143. The heart of an agouti (*mus aguti*). The auricles are small and thin: the auricular appendages form the larger bulk of the cavities: the walls of the right ventricle are thin, and exhibit few carneæ columnæ, except those belonging to the tricuspid valve. The flesh of the left ventricle is remarkably thick, and its cavities small. The arch of the aorta sends off one trunk as in the marmot. (142).—J. H.

B. *b.* 153. The heart of a pig (*sus scrofa*). The right

auricle receives the venæ cavæ at an angle near each other: the auricular appendix is large and nearly membranous: and the fossa ovalis so thin as to be diaphanous. The right ventricle is small, its coats thin, and the fleshy columns in its interior few and little prominent; there are three of those columns for the attachment of the tricuspid valve, and even they are less marked than is common among the mammalia. The semilunar valves of the pulmonary artery are shown in the position which they occupy, when preventing regurgitation of blood into the ventricle. The left auricle is thin; the auricular appendix large: the entrance of the pulmonary veins by a common orifice. The left ventricle is large andfleshy, the carneæ columnæ numerous and broad, but not prominent. The arch of the aorta furnishes two branches.—J. H.

B. *b*. 161. The heart of an alpacca (*camelus lama*). It is long and very pointed at the apex: the internal surface of the right auricle is smooth all over, except in the appendix, where it is pectinated: the right ventricle is pyramidal, placed vertically, and almost devoid of carneæ columnæ: one fleshy column of considerable thickness extends from the anterior to the posterior wall: two others afford attachment to the cordæ tendineæ of the tricuspid valve: the left auricle is pectinated in the apex only; the openings of the pulmonary veins are close together: the left ventricle possesses four times the thickness of the right, and projects in a pointed manner beyond it, forming the apex of the heart: it is perfectly smooth inside, there being not even carneæ columnæ for the insertion of the tendons of the mitral valve. The arch of the aorta gives off one trunk, from which all the vessels of the head and anterior extremities are derived.—J. H.

B. *b*. 162. The heart of a dromedary, preserved in such manner as to demonstrate the anatomy of every part of the organ. It is very large, broad, and pointed at the end by the projection of the left beyond the right ventricle. The right auricle is situated above (anterior to) the coresponding ventricle, and is all smooth except at the apex in which a few musculi pectinati are found: the openings of the venæ cavæ are close together in the right wall of the auricle. The thickness of the right ventricle is inconsiderable: its internal surface presents only two fleshy columns, one for affording attachment to the tendons, belonging to the united corners of the anterior, and posterior divisions of the tricuspid valve; the other for fixing the cordæ tendineæ of the posterior division to the septum: the valve next to the pulmonary artery is not furnished with any fleshy column, the cordæ tendineæ

being attached to a flat, smooth, muscular surface: the semilunar valves of the pulmonary artery are shown; their structure and arrangement is very beautiful. The left auricle is less capaceous, but more fleshy than the right. The left ventricle is treble the thickness of the right, and it is more capaceous; its internal surface is perfectly devoid of carneæ columnæ, there not being even one for the tendinous cords of the mitral valve. A long fine tendon, attached only by the ends, is stretched across the cavity from one wall to the other. The most of the leading vessels of the heart are preserved in the preparation: the arch of the aorta is shown to furnish but a single trunk.—J. H.

B. *b.* 163. This is a section of the heart of a dromedary—(*camel. drom.*) a square piece cut out of the anterior wall of the right ventricle. The internal surface is shown to be perfectly smooth and devoid of any carneæ columnæ.—J. H.

B. *b.* 164. The heart of a deer (*cervus elaphus*), about two months old. The foramen ovale and ductus arteriosus are still open. The venæ cavæ open near each other, and at a considerable angle in the right auricle which is divided into two distinct compartments by the projection of the tuberculum Loweri: the inferior (posterior) cava which opens into the lower compartment appears to lead directly to the foramen ovale; the superior which opens into the upper compartment conducts the blood in the direction of the auriculo-ventricular opening: the auricular appendix is large and sacculated by the projection of the musculi pectinati. The right ventricle is thick in substance, its cavity is small, and its position oblique: there are no carneæ columnæ except those belonging to the tricuspid valve, and a solitary bundle which extends across from one side of the cavity to the other: the valves of the pulmonary artery are closed down over the mouth of the vessel. The left auricle is fleshy and pectinated, and its appendix large. The left ventricle is very muscular and pointed at the extremity: its cavity is small and devoid of fleshy columns. There is only one large vessel supplied from the arch of the aorta.—J. H.

B. *b.* 165. A portion of the root of the aorta of a rein deer (*cervus tarandus*) showing a lamina of bony matter deposited between its layers.—J. S.

B. *b.* 176. The heart of a seal (*phoca vitulina*), preserved in spirits, and prepared so as to exhibit the anatomy of all its compartments. The form of the heart is broad and short. The right auricle is very muscular and thrown into pouches by the thickness and projection of the musculi pectinati:

its appendix constitutes the larger part of the cavity: the orifices of the venæ cavæ are near to each other and unusually wide: the tuberculum Loweri is very prominent: the Eustachian valve is large and muscular: the foramen ovale is perfectly closed. The right ventricle is somewhat smaller than the left and about half its thickness: the carneæ columnæ are numerous and prominent in the concave wall, but are altogether wanting in the convex, and several conspicuous columns extend across the cavity from one wall to the other: the tricuspid valve is deeply indented; its two anterior thirds possessing considerable range of motion are broad, furnished with long tendons and three or four fleshy columns which arise from the concave wall; the posterior third lies close against the septum to which it is fastened by a few short cordæ tendineæ without the intervention of columnæ. The left auricle is large and fleshy, and its appendix very prominent and pectinated. The left ventricle is amazingly thick; and there are besides in the interior numerous long fine tendons, which running in different directions, and making various intersections with each other, produce a very singular reticulated appearance: the mitral valve presents no peculiarity other than that its festoons are very prominent—its tendons long and thick—and its fleshy columns very much developed. The arch of the aorta with its three vessels—the pulmonary artery with its right and left branches—and the ductus arteriosus connecting the two great trunks together are all shown in the preparation.—J. H.

B. *b.* 177. The heart of a seal injected and dried. The right or pulmonary cavities are filled with blue wax, the left or systemic with red. The organ differs little in form from that of other mammalia. The thoracic aorta is shown running behind the heart: three branches arise from its arch. The pulmonary artery (injected blue) gives off the ductus arteriosus to be joined after a short course to the concavity of the arch of the aorta, and then divides into two trunks which run to be ramified one in the right, the other in the left lung. The pulmonary veins filled with red wax are shown attaching themselves to the sides of the left auricle. The ascending and descending venæ cavæ may be known by the blue colour of the injection which fills them.—J. H.

B. *b.* 180. The heart of a young porpesse (*delphinus phocæna*). The cavities are all exposed to view. There are two auricles and two ventricles—pulmonary and systemic—as in other mammalia. The auricles are large, very fleshy and pectinated, and placed at the upper (anterior) part of the

heart. The ventricles have very thick walls ; and the organ presents this peculiarity that the pulmonary ventricle is equally thick and fleshy as the systemic : there are numerous carneæ columnæ all over the interior of both cavities. The tricuspid and mitral valves are arranged as in the hearts of other animals of the same class ; and their festoons are equally furnished with tendinous chords, and muscular columns. The foramen ovale and ductus arteriosus are both in this instance partially open—a condition of parts found only in the young animal, and which ceases as it becomes more fully grown. The pulmonary artery is nearly as thick and large as the aorta. The arch of the aorta gives origin to two vessels.—J. S.

B. *b*. 201. The heart of a swan (*anas cygnus*). This preparation was made by the distention and hardening of the cavities in spirits previously to their being cut open. It is very perfect and may be taken as a specimen of the heart such as it exists in birds generally, there being few other varieties among the individuals of this class than may be found in the magnitude or degree of elongation of the organ. The heart consists of the same number of cavities as in mammalia viz., two auricles and two ventricles, but its form is usually more conical—its place in the thorax nearer the sternum—and the direction of its axis more from before backwards than in that tribe. The pericardium is exceedingly thin (see B. *b*. 208) and supported in one of those membranous cells which, communicating with the lungs, receive air therefrom to lessen the specific gravity of the bird, and facilitate its loco-motion in the act of flying. The auricles are smaller and have not such projecting appendages as in mammalia : the right is somewhat larger than the left, but the latter is the more muscular and pectinated : four veins open into the right auricle, all furnished with valves at their mouths : a transparent fossa ovalis may be seen at the upper and back part of the cavity forming a septum auricularum. The pulmonary ventricle envelops the upper and right side of the systemic, without being prolonged to the apex of the heart as in mammalia : there are no carneæ columnæ in this ventricle except a few along its lower border ; neither are there any fleshy papillæ or tendinous cords. The right auriculo-ventricular valve is fleshy : it appears to be formed of a portion of the concave wall doubled into the cavity of the ventricle, along the anterior border of the opening : its free edge is sharp and attached in a short extent to the opposite or convex wall. The fibres which compose the valve take a

transverse course, and they may by their contraction which takes place at the same moment as that of the ventricle press the valve so closely against the convex wall as effectually to shut up the opening. Blumenbach thinks that this structure gives to the valve an additional power—that of forcing the blood into the lung which dilates with difficulty in this class of animals. The left ventricle gives form to the heart ; it is three or four times thicker than the right, and covered on its internal surface with numerous carneæ columnæ all of which take a longitudinal direction. There is a mitral valve as in mammiferæ consisting of two festoons attached to the surface of the ventricle by numerous cordæ tendineæ. The cavity of this ventricle appears less capacious than that of the right. The aorta immediately after its origin from the heart divides into three trunks of nearly equal size.—J. H.

B. *b.* 202. The heart of a cormorand (*pelicanus carbo*) prepared as 201. The auricles are thin and devoid of appendages : the right auriculo-ventricular valve is fleshy : the left ventricle is more muscular than the right : the aorta divides soon after its origin into three.—J. H.

B. *b.* 204. The heart of a turkey (*meleagris*) prepared like 201-2. The anatomy of all its parts is demonstrated.—J. H.

B. *b.* 205. This preparation exhibits two hearts. The upper one is that of a puffin (*alca arctica*) ; the lower that of a curlew (*scolopax arquata*) : the auricles, ventricles, valves, &c. are all shown in both.—J. H.

B. *b.* 206. The heart of a bird cut across through the ventricles to show the relative proportions of their size and thickness The left ventricle forms at least two thirds of the flesh of the heart, and its cavity is small and circular. The right ventricle appears as it were lapped around the outside of the left, and presents in the section a narrow slit-like cavity.—J. S.

B. *b.* 207. The heart of a turkey (*meleagris*) prepared in the same manner and exhibiting the same parts as preparation B. *b.* 206.

B. *b.* 208. The heart and pericardium of a heron (*ardea major*). The form of the heart is that of a long narrow cone. The pericardium is fine and transparent : the bag which it forms having been filled with some of the spirits in which the preparation is preserved, it looks like a thin gauze floating in the fluid. Its external surface has no fibrous connection with the surrounding parts being enveloped in one of the serous air vescicles.—J. H.

B. *b.* 220. The heart of a tortoise (*testudo mydas*). It is somewhat broader than long, and consists of two auricles and

one ventricle. The auricles are larger in proportion to the ventricle than in mammalia and birds: their form is rounded, and their place at the top of the ventricle. The walls of these auricles are thin and formed internally into a net-work of musculi pectinati: the right which may be distinguished from the left by its larger size, receives the blood from the veins of the body by one opening which is furnished with two semilunar valves: the left gives entrance to the pulmonary veins which have likewise double semilunar valves. A membranous partition separates the auricles from each other. The ventricle is very muscular, two thirds at least of its bulk being flesh: its cavity is divided into two compartments by a thick muscular partition which is incomplete near the base, and besides is cribriform all over the surface. One of these compartments is called pulmonic as it receives the blood from the lungs—the other systemic as the venous blood of the body is emptied into it. The openings from the auricles are situated in the base of the ventricle, and are furnished with a peculiar square valve the use of which is twofold; first, to direct the blood of the right or corporeal auricle into the systemic compartment of the ventricle, and secondly, to conduct that of the left into the pulmonary compartment. Both the aorta and pulmonary artery take origin from the systemic compartment of the ventricle, so that the blood from the lungs which has been discharged into the pulmonary ventricle, must necessarily filter through the imperfect septum and become mixed with the corporeal venous blood previous to its transmission into these arteries.—J. H.

B. *b*. 224. The heart of an alligator (*lacerta alligator*) injected, and prepared to show the structure, cavities, orifices &c. of the organ. It is the most complicated heart among the reptiles. It consists of two auricles and one ventricle. The auricles are not so large as in the turtle (220), but they are more fleshy and pectinated. They are situated at the top of the ventricle, and behind the roots of the great vessels which arise from that cavity: a thin semi-transparent membrane is the only partition between them: the right receives the venous blood from the body; the left is the receptacle for that from the lungs; see B. *b*. 220. The ventricle is oval and fleshy, and its cavity is divided into three lodges or compartments communicating with each other by a variety of openings, and all of which are displayed in the preparation. Two of the lodges appear lying parallel on the anterior surface of the ventricle. Of these two, that a little below and to the right receives the blood of the right auricle by a wide valvu-

lar opening which may be seen in its superior part ; and discharges it again through two apertures—the first a passage into the adjoining compartment, the second the orifice of the left descending aorta which conducts it chiefly to the viscera; the other a smaller lodge receives only the blood sent into it from the former, and discharges it again into the mouth of the pulmonary artery which arises from its upper and left corner. The third ventricular lodge may be seen by turning round the preparation : it is situated at the left and posterior part of the heart, and appears longer and more muscular than either of the former. The blood which fills this cavity is that of the pulmonary auricle on its way from the lungs : the aperture through which it flows in is guarded by two valves ; and close to it is the aperture of exit (indicated by a black bristle) conducting the blood into the right descending aorta—the trunk which furnishes the carotids, axillaries and iliacs. There are likewise numerous small holes in the septa of the compartments which allow of a mutual intermixture of the blood contained in these cavities.

It results from this arrangement of the heart that the corporeal venous blood is distributed chiefly to the viscera and lungs through the two first described lodges, left aorta and pulmonary artery ; and that the blood from the lungs passing through the third or posterior compartment is propelled thence along the right aorta and its ramifications to the head, tail and extremities. There is less intermixture of the pulmonary and corporeal blood in the cavities of the heart in this species of reptile than in the turtle described at B. *b*. 220.—J.S.

B. *b*. 225. The heart of an alligator, injected. Its cavities after distension and hardening in spirits were cut open so as to exhibit their interior. The description given of the heart 224 is equally applicable to this.—J. H.

B. *b*. 226. The heart of a chameleon (*lacerta chameleon*). The heart is composed of two auricles and one ventricle. The auricles are large and placed at the upper part of the ventricle ; and to the side of each a large sinus is connected which receives the blood of the body and tongue : the two veins which return the blood from the erectile tongue discharge it directly into this peculiar reservoir when suddenly abstracted from the organ during the subsidence of that congestion by which its elongation, and protusion in catching insects is accomplished. The ventricle is triangular and muscular. The lungs are two in number and extend on each side from the neck to the sacrum : the cells of which they are formed are polygonal ; they are small near the neck, gradually become

larger towards the middle of the lung, and at the posterior end have almost disappeared in the formation of one large membranous vesicle.—J. H.

B. *b*. 227. The heart of a boa-constrictor dissected and displayed. The heart is more simple than in the alligator. Its compartments are two auricles and one ventricle. The right auricle which receives the blood from the body is larger than the left which is the reservoir of that from the lungs: their walls are thin and transparent in the interspaces between the fleshy fibrillæ which form an extensive irregular interlacement all over the internal surface: a membranous partition separates the one auricle from the other The form of the ventricle is that of a cone the base of which rises a little higher on the left than on the right side, and the surfaces of which are flattened before and behind: it is formed of a large mass of muscular fibres which exhibit in the interior a multitude of fine fasciculi. The cavity is divided into two lodges, of which one is placed before and a little below the other: these lodges are separated by a partition which is perforated by numerous foraminula and further completely deficient on the right side, where a smooth wide hole establishes a free communication through it: the openings of the auricles are in the base of the ventricle and both lead into the posterior or superior lodge. Three arteries take origin from the ventricle—the pulmonary artery and two aortæ; all of which are attached to the right corner of its base: the origin of the pulmonary artery is that which appears most to the left; it leads from the anterior lodge, and is furnished with a double valve which is shown very plainly in the preparation: the origin of the left aorta is close to the right side of the former, and opposite the passage of communication between the lodges: it also belongs principally to the anterior lodge and presents a perfect valvular mouth: the origin of the right aorta is concealed by the other two vessels and leads out of the posterior lodge.

The course, then, of the blood through the cavities of such a heart as this, must be as follows: from both body and lungs it is received into the posterior lodge of the ventricle, from which after being mixed it is discharged, in part into the right aorta, and in part is transmitted through the openings in the septum to be transmitted into the mouths of the left aorta and pulmonary artery. The two aortæ subsequently run into one at a short distance beyond the apex of the heart and form a single posterior aorta. This coalition of the two vessels is shown in preparation B. *b*. 229.—J. H.

B. *b*. 228. The heart of a rattlesnake (*crotalis horridus*).

The auricles, ventricles, and blood-vessels are opened and displayed, and the course of the auriculo-ventricular passages demonstrated by pieces of whalebone. The description of the heart of the boa-constrictor (227) will apply equally to this, which has been prepared in the same manner.—J. H.

B. *b.* 229. The heart of a rattlesnake (*crotalis horridus*) injected with coloured wax, dried and varnished. The auricles and veins are blue, the ventricles and arteries red. The junction of the right and left aortæ at a short distance below the heart is demonstrated in the preparation.—J. H

B. *b.* 230. The heart of a serpent. The cavities of the heart, and the chief blood vessels leading from it are distended with gelly and preserved in spirits. The relative size and position of the auricles and ventricle may be well understood from an inspection of this preparation—J. S.

B. *b.* 231. The heart of a frog-fish (*lophius piscatorius*). This preparation gives an accurate notion of the construction of the heart in fish. There is a single auricle and single ventricle whose sole use is that of propelling the corporeal venous blood into the lungs, to be rendered arterial by the influence of the water in which these organs are naturally immersed. The auricle is situated on the dorsal side of the ventricle ; is of a square shape ; muscular in structure ; and much fasciculated on its internal surface. At its back part the common opening from the veins guarded by a double semilunar valve may be seen : and anteriorly the passage which conducts the blood into the ventricle is exhibited. This passage is wide, and furnished with two semilunar valves which give the opening a slit-like form. The mechanism of this valve is demonstrated very plainly in the preparation. The ventricle forms an irregular square : its fleshy structure is vastly more abundant than that of the auricle : it is smooth on the external surface, and presents many fleshy columns internally. Nearly in the centre of its dorsel wall, the opening leading from the auricle is placed : that which forms the mouth of the pulmonary artery is situated at its anterior border. The commencement of the pulmonary artery is surrounded by a thick muscular structure of a pyramidal shape, termed the pedicle : the internal surface of the pedicle exhibits numerous muscular fasciculi arranged in a longitudinal direction : three continuous semilunar valves guard the opening leading from the ventricle into the pedicle of the pulmonary artery.—J. H.

B. *b.* 242. A beautiful preparation of the heart of a shark, hardened by distention with alcohol, and then cut open in

such a manner as to show its construction. There is a single auricle and ventricle : the auricle is enveloped by a thin stratum of muscular fibres, which internally assume the form of long fasciculi, leaving interstices in which the other tunics are transparent : in the centre of the posterior margin the opening of the veins may be seen. The ventricle is flat and nearly round ; two thirds of its bulk is muscle : the auriculo-ventricular opening is situated in the left side of its dorsal wall, and is furnished with a semilunar membranous valve : the opening which transmits the blood into the pedicle of the pulmonary artery is placed in the centre of the anterior wall of the cavity, to the right of the former opening. The pedicle is short and cylindrical ; it is smooth internally, except at its junction with the artery where it presents a row of three well formed semilunar valves. The valves noticed in the heart of the frog-fish (241) as being placed at the commencement of the pedicle are here transferred to the termination of that peculiar part of the vessel.—J. H.

B. *b.* 243. The heart of a sturgeon (*ascipenser sturio*). Its auricle and ventricle with their respective openings and valves are all exhibited. In form the heart is pyramidal, and as to proportion in its cavities, the auricle is very small compared with the size of the ventricle. The shape of the auricle is very irregular, and its cavity is much fasciculated. The ventricle is three sided and of great thickness : the opening from the auricle into it is situated opposite and posterior to that of the pulmonary artery. The pedicle is oval, and furnished with two rows of valves : the row next the ventricle consists of four semilunar valves, that at the extremity of the pedicle adjoining the artery, of five, and of all which the free or concave borders are directed forwards. J.H.

B. *b.* 244. The heart of a dog-fish (*squalus caniculus*), showing all the cavities, valves, &c. The pedicle is short, cylindrical, and furnished with three rows of valves, with three valves in each row.—J. H.

B. *b.* 245. The heart of a ray (*raja batis*). The auricle is very irregular in shape, and four appendages like auricular processes stand forwards from its anterior part : the coats of this compartment are thin, and its muscular columns beautifully pectinated. The ventricle is flat, and broader than long ; and the cavity in its interior is small compared with the general bulk of the organ : the opening from the auricle is in its left side. The pedicle is long and cylindrical : and its canal much contracted and furnished with four rows of valves preventing regurgitation into the ventricle.—J. H.

B. *b.* 246. The heart of a torpedo (*raja torpedo*) showing its cavities and openings. In size the organ is smaller than in the common ray (244), but in exterior form the two bear much resemblance : the auricle is of irregular shape, and thin in texture ; the ventricle is triangular and fleshy : the pedicle is cylindrical and furnished internally with four rows of valves

The six last described preparations exhibit, in addition to many other interesting points, the principal varieties in the valvular construction of the pedicle of the pulmonary artery.—J. H.

B. *b.* 250. The heart of a wolf-fish (*anarhichas lupus*). The auricle is small in proportion to the ventricle : the pedicle is globular—it presents numerous longitudinal muscular columns, and has a singular row of valves at the ventricular orifice.—J. H.

B. *b.* 251. The heart of a pike (*esox lucius*). The auricle is three-sided : the ventricle and the pedicle are like two cones united base to base.—J. H.

B. *b.* 252. The heart and pericardium of an eel. The surface of the heart is connected to the pericardium by numerous, long, fine, tendinous bands.—J. S.

B. *b.* 253. The heart of a *tetrodon mola.* The auricle and ventricle are both opened to show the numerous muscular bundles : the valves at the auriculo-ventricular opening and those at the mouth of the pulmonary artery are of the same construction—consisting of four each, two large and two small : the pedicle is also furnished with several rows of valves, and is formed of thick muscular parietes.—J. H.

B. *b.* 254. The heart of the spiny shark (*sq. spinosus*). The heart is very large, and all its cavities, openings, and valves are clearly exhibited. The auricle is capacious, thin, and beautifully pectinated : two broad and very perfect semilunar valves guard the opening leading from it into the ventricle ; a bit of blue paper passed under each shows it to advantage. The ventricle is thick, and its carneæ columnæ are numerous and very distinct. There are three rows of valves in the pedicle, and each valve presents a broad bundle of muscular fibres running vertically from the centre of its fixed, to the centre of its free edge : the greater proportion of these valves appears to be of a muscular nature.—J. H.

B. *b.* 270. In this preparation, the heart and principal blood-vessels, the gills, and the intestines of a cuttle-fish (*sepia loligo*) are displayed. The gills, two beautifully laminated organs, appear at the upper and lateral parts of the

preparation ; the intestines are shown at the lower part ; and the complex heart with its arteries and veins are made evident in the centre.

The heart consists of three separate and detached ventricles, without auricles ; the two lateral ones situated at the roots of the gills drive the venous blood into these organs, and are called pulmonary or branchial ; the central ventricle which propels the blood collected from the gills into the body is called systemic : the two first, as to function, are analogous to the pulmonary cavities of mammalia—the last performs the same office as the systemic part of the organ in that class. The veins of the body previous to their junction with the pulmonary ventricles pass through singular spongy organs which open by numerous foramina into the canals of these vessels. These ventricles are flat and four-sided ; and connected with the posterior margin of each may be noticed a small white fleshy body, having no connection with the general cavity, and the use of which is unknown : each receives by its inner side a large vein from the body ; and by its outer gives off a vessel which distributes its blood to the adjoining gill : the trunk of this vessel enters between the gill and the sheath of the animal to which the gill is attached, and then ramifies on the laminæ of the organ. There are valves at the entrance of the former vessel into the ventricle, but none at the exit of the latter. The veins—the spongy organs—the pulmonary ventricles—and the vessels passing from them to the gills, are all distinguished by blue injection.

The systemic ventricle is situated midway between the two former, than which it is larger and more muscular : two large beautifully injected vessels, which may be seen arising by numerous radicles from the laminæ of the gills and running along their floating borders, convey into the sides of the ventricle the arterialized blood : others, which pass off from the ventricle anteriorly and posteriorly, conduct this fluid to the different departments of the body. The branchial veins from their finest ramifications on the gills—the systemic heart—and the principal arteries given off from it have been successfully injected red.—J. H.

B. *b.* 271. The middle or systemic heart of a cuttle-fish (*sepia loligo*) cut open to show the numerous fleshy columns in its interior, and the valvular openings of its arteries and veins. Portions of the branchiæ and their corresponding pulmonic hearts are shown at the sides of the preparation.—J. H.

B. *b.* 272. The three hearts of a cuttle-fish (*sepia loligo*) The branchiæ are shown connected to the lateral hearts by the

pulmonary artery, and to the central one by the pulmonary veins. The roots of the aorta from the anterior and posterior angles of the central or systemic heart are preserved in the preparation.—J. H.

B. *b.* 273. The central or systemic heart of a cuttle-fish. (*sepia officinalis*). The preparation exhibits the thickness of its tunics—the beautifully reticulated condition of its internal surface—and the valves at the orifices of its veins.—J. H.

B. *b.* 274. The heart of a crab (*cancer mœnas*). It consists of a single ventricle without auricles, for receiving the blood from the branchial veins, and propelling it through the arterial system into the body. It is a simple systemic heart, analogous in office to the systemic compartments in mammalia and birds. In its cavity which is laid open numerous columns of muscular fibres may be seen crossing and mixing with each other in every direction.—J. H.

B. *b.* 275. The heart of a cray-fish (*cancer astacus*). It is a systemic heart without auricles like that in the crab (274). The muscular fibres which constitute it are pale and white, but they are nevertheless distinct and well developed.—J. H.

B. *b.* 276. The heart of a razor-fish (*solen siliqua*). It is a single cavity, the fibres of which lie on and surround the tube of the rectum. Its use is to propel the arterialized blood of the gills into the body. The intestinal tube is demonstrated by black bristles passed under it in several places. See A. *b.* 596.—J. S.

B. *b.* 278. A large earth-worm (*lumbricus terrestris*) preserved so as to demonstrate the long dorsal vessel. There is no distinct heart to be found in connection with the vascular system.—J. H.

B. *c.* 300. A section from the surface of a human liver, injected, dried and preserved in spirits of turpentine : the preparation shows a stellated or star-like arrangement of the vessels.—J. S.

B. *c.* 302. A portion of artery from a nylgau, (*antil. pict.*) demonstrating the structure and arrangement of its several tunics.—J. S.

B. *c.* 303. A part of the internal jugular vein of a dromedary (*camel. dromed.*) slit longitudinally to show the arrangement of the valves.—J. H.

B. *c.*304. A part of the internal jugular vein of a dromedary, inverted to demonstrate the valves.—J. H.

B. *c.* 305. A section of the aorta of a dromedary (*cam. dromed.*) showing its laminated and fibrous structure.—J. H.

B. *c.* 306. A section from the aorta of a dromedary pre-

pared so as to show by another view the structure and arrangement of all its tunics.—J. H.

B. *c.* 307. A full length carotid artery from the neck of a dromedary. A dark colored thread has been tied around the extremity which lay next the heart, to afford an opportunity for making a comparison of its remote ends.—J. H.

B. *c.* 312. A corroded preparation of a human kidney. The injection of this preparation, and its corrosion by acid have been most successful : the arteries are red, the veins green, and the tubes of the ureters black.—J. S.

B. *c.* 330. A dry preparation showing the peculiarities of the circulation in the human fœtus. The umbilical vein together with the vena porta which communicates with it in the liver are painted yellow, and the ductus venosus—a continuation of the vena umbilicalis into the venæ cavæ hepaticæ, is shown white : the venæ innominatæ, the cavæ, the right cavities of the heart and the arteria pulmonalis are filled with black injection : the pulmonary veins are made to appear green ; and the left cavities with the aorta and its branches are injected red : the umbilical arteries are of the same colour ; and the ductus arteriosus extending from the pulmonary artery into the arch of the aorta appears as a large vessel painted white : its size is double that of the other trunks into which the pulmonary artery divides.—J. S.

B. *c.* 332. The arch of an aorta from a human subject from which five branches take origin. The two first are the right and left carotids ; the third the left vertebral ; the fourth the left subclavian ; and the fifth the right subclavian, which in the connected state of the parts ran across the spine behind the œsophagus to reach its destination in the right armpit.—J. H.

B. *c.* 333. This preparation, preserved in spirits, shows the right subclavian artery taking its origin as the last branch from the aorta, and running thence behind the trachea and œsophagus to the right axilla. It shews also a fact first noticed by Doctor Hart, that in this deviation from the regular course of the artery, the right inferior laryngeal or recurrent nerve does not as usual wind round the vessel. It shows the nerve, as described by him, arising from the pneumo-gastric about the middle of the neck and running directly inwards to enter the lower part of the larynx. (see D. *a.* 4.)—J. H.

B. *c.* 334. A preparation showing the same irregularity in the distribution of the right subclavian artery as that at B. *c.* 333, viz.—the artery arising from left side of the arch of the aorta and crossing between the spine and œsophagus to gain

the right side. In this case, that of an old beggar-woman related by Professor Kirby in the second volume of the Dublin Hospital Reports, a piece of bone which had been swallowed perforated the œsophagus and wounded the irregular artery at the point of its contact with that tube.—*Professor Kirby's Collection.*

B. *c.* 335. This preparation shows irregularities in both the right thyroid arteries. The inferior thyroid takes origin from the arteria innominata and runs up to the thyroid gland, lying in its ascent on the anterior part of the trachea, and where it must have been wounded had the operation of tracheotomy been performed on the individual the subject of such irregularity. The superior thyroid arises as usual from the external carotid, but crosses the centre of the cryco-thyroid membrane—lying precisely on the spot where the knife is introduced in laryngotomy.—J. H.

B. *c.* 336. A preparation in which there are three thyroid arteries. The superior and inferior hold their usual position; the third, or middle thyroid as it is called, arises from the arteria innominata, and ascends on the front of the trachea to enter into the middle lobe of the thyroid gland.—J. S.

B. *c.* 337. The arm of a child in which the radial artery takes origin from the axillary. In its course over the elbow it anastomoses by a large branch with the ulnar artery : it then assumes its usual position, and as it passes the wrist joint, furnishes a superficialis volæ nearly as large as the ulnar, and which by anastomosing with this latter vessel in the palm of the hand forms the superficial palmar arch.—J.S.

B. *c.* 341. A most successful injection of the blood vessels and lymphatics of the hand and forearm. The arteries are red, the veins, which are shown even to the fingers ends, are blue. Several lymphatics appear on the back of the hand and forearm injected with quicksilver. The preparation is dried and preserved in a bottle.—J. H.

B. *c.* 342. A successful injection of the arteries and veins of the hand with quicksilver. The capillaries of the surface are shown to great advantage ; the tops of the fingers especially under the nails, are completely covered with small convoluted vessels, and all the large sub-cutaneous trunks are fully distended with the quicksilver.

The hand of a young emaciated subject is the best fitted for making a preparation of this kind. The following will be found a satisfactory mode of proceeding. A very tight ligature should be bound around the fore-arm a little below the wrist, with compresses under it

before and behind on the interosseous spaces, for the purpose of stopping up completely all passage through the vessels : a tube capable of holding a considerable column of quicksilver should then be introduced and secured in the radial artery below the ligature, with the least possible injury to any of the small vessels. The quicksilver is now to be poured into the tube, held slantingly, when it will flow with great rapidity and fill every artery and vein in the hand : the injection may be known to have succeeded when the veins on the dorsum appear moderately filled. Hot water should now be poured on the hand so as to loosen the cuticle and nails, which are to be carefully scraped off in order that the subsequent drying of the cutis, and the exhibition of the subcutaneous vessels may be complete. The hand should now be exposed to a current of dry air, with the tube still in the radial artery, as it may be necessary from time to time to add a little more quicksilver in case any of the vessels appear empty, which may be readily ascertained in the progress of drying, as the vessels become every day more and more visible. As soon as the hand is completely dry, amputation of it may be performed above the wrist in the site of the ligature, and a cement applied to the cut surface to prevent the exudation of quicksilver, which will be likely to occur from the cancellated ex-extremities of the bones or some small openings in their vicinity. Sealing wax is a convenient cement and will sufficiently answer the purpose. The whole is now to be immersed in clear spirits of turpentine, by the operation of which the dried flesh is not only preserved but rendered transparent, and the quicksilver in the vessels madeto appear of a brilliant yellow colour—altogether making one of the most beautiful and instructive exhibitions of vascular anastomosis that the anatomist is capable of producing. -J. H.

B. *c.* 243. The arm of an adult showing the ulnar artery taking origin from the brachial about midway between the axilla and elbow : in descending it lies superficial to the flexor muscles of the fore-arm.—J. S.

B. *c.* 344. A preparation of the fore-arm with the arteries injected, showing the radial branch as it approaches the wrist, turning round the radius to be applied to the back part of that bone.—J. S.

B. *c.* 345. A successful injection of the arteries and veins of the hip and pelvis. All the branches from the origin of the inferior hæmorrhoidal down to that of the anastomotica magna in the thigh are injected and demonstrated.—J. H

B. *c.* 346. An unusual irregularity of the femoral artery.

Below the origin of the arteria profunda this vessel divides in two branches of nearly equal size, which run parallel and close to each other as far as the opening in the tendon of the triceps, where they unite again and form a single trunk, the popliteal artery. The popliteal thus formed differs in no respect from that vessel under ordinary circumstances. This variety in the femoral artery is very rare. See Dublin Hospital Reports, vol. 4. Only one other instance of it is recorded —that by Sir C. Bell, in which one of the subdivisions was tied for the cure of an aneurism in the ham, but without success, as the other branch continued to convey blood into the aneurismal sac.—J. H.

B. *c.* 347. Irregularity in the anterior tibial artery. This vessel is unusually small and ends by joining with the peroneal which comes forward through the interosseous ligament a little above the ankle, and runs on the dorsum of the foot giving off the same branches, and terminating in the same manner as the anterior tibial usually does.—J. S.

B. *c.* 348. This which is a wet preparation shews an unusual artery entering into the inferior extremity of the kidney.—J. H.

B. *c.* 361. A preparation of the heart and blood-vessels of a monkey (*simia sabæa*). The arteries are injected with red wax, the veins with blue ; and both systems are dissected and exhibited all through the extremities.—J. S.

B. *c.* 365. A successful injection of the heart and blood-vessels of a dog. The arterial system is red, the venous blue ; and all the vessels of any note in the body and extremities are clearly demonstrated.—J. H.

B. *c.* 366. A preparation showing the heart, and the vessels in the thorax of a dog. Two trunks arise from the arch of the aorta : the first furnishes the right subclavian and both carotids ; the second becomes the left subclavian.—J. H.

B. *c.* 367. A glass case containing two preparations of the circulation in a badger (*ursus meles*). One shows the heart and blood-vessels of the trunk and anterior extremities : the other exhibits the arteries of the head, with the internal carotids forming the rete mirabile at the side of the cella turcica.—J. H.

B. *c.* 368. The pelvis, rectum, bladder and posterior extremity of a dog ; showing the distribution of the arteries to these parts.—J. H.

B. *c.* 369. The foot of a horse injected with wax and preserved in spirits of turpentine, showing the vascularity of the sensible hoof which lies between the bone and the horny hoof. The arteries are red, and the veins yellow : the whole surface is one uninterrupted stratum of anastomoses.—J. S.

B. *c.* 370. The foot of a calf with the arteries and veins injected with wax—the former red, the latter blue. The trunks and branches of both the anterior and posterior tibials are well shown.—J. H.

B. *c.* 371. A preparation showing the vascular system in a double fœtal calf. As there are several preparations of this monster in the museum, a general account of them shall be given here, with references to each in their respective places on the shelves. The chest (G. *b.* 123) was double, the two sides being separated by a fibrous partition. Each of the compartments contained all the organs belonging to a well formed thorax, viz., a heart, two lungs, and their respective vessels. The abdomen on the contrary was a single cavity having for its boundaries, superiorly two spinal columns nearly touching each other—inferiorly and at the sides the abdominal muscles—anteriorly a diaphragm common to the two thorax's—and posteriorly a pelvis. The liver was single, but appeared as if it were formed by the conjunction of two, from its having two gall bladders, from its being supplied with two sets of hepatic arteries, and from its sending out two sets of hepatic veins, one leading to the right, the other to the left heart. There were two stomachs and two duodenums, which latter, however, soon became united at an acute angle, making a single intestinal canal for the remainder of its course, and one anus ; see G. *b.* 126. The kidneys were only two in number, the right of one animal and the left of the other : the close proximity of the spines at this place prevented, perhaps, the development of their fellows. There were likewise two testicles corresponding to the same sides of the spines as the kidneys. The pelvis like the abdomen was a single cavity (see the skeleton, G. *b.* 123.) bounded above by two sacrums, and on the sides by ossa innominata, which though articulated superiorly with different sacrums, joined inferiorly at a common symphisis. This heterogeneous pelvis afforded attachment to the two limbs. In the cavity of the pelvis, a bladder, penis, vesiculæ seminales, ureters, &c. were contained ; but the opposite halves of each belonged to different animals, and were so united as to form one perfect system of organs. The opposite sides of the bladder were supplied with nerves from different spinal marrows, and blood-vessels from different aortæ : the ureters which entered the organ came from kidneys which corresponded to different spines, although they joined it, as if belonging to one animal with two proper kidneys—(G. *b.* 125). The vasa deferentia, too, the ducts of the testicles above alluded to, formed com-

mon tubes with perfect vesiculæ seminales which like themselves were not fellows, but which nevertheless lay near each other in the usual manner, and opened into the urethra in the accustomed place (125). The penis was likewise single, though its crura were attached to pubic bones which were connected superiorly to different sacrums, but formed a common symphisis below. Thus, of these pelvic organs, though all properly shaped, the opposite halves of each belonged, as might be said, to different animals.

The preparation before us shows the peculiarities of the circulation. There were two hearts corresponding to the two chests, and both perfectly and fully formed: the only appreciable difference between them lay in the size of the organ, that on the right being somewhat larger than that on the left. Each received and gave off the usual blood-vessels. An aorta arose from each, and after supplying the head and anterior extremities coursed along the corresponding spinal column as far as the pelvis, where it approached and became connected with the other by a short wide branch. From this point of communication, the two aortæ became in every respect like the common iliacs derived from an ordinary aorta, supplying the internal iliacs, umbilicals, femorals, &c. all of which are shown in the preparation. All the veins from the pelvis, posterior extremities and kidneys joined together to form one vena cava which followed the aorta of the right heart, and opened into the right auricle of that organ: the ductus venosus, too, discharged its blood in the same direction. None of the blood from these sources found its way to the heart of the left thorax—the posterior vena cava belonging to this organ, being very small and formed exclusively by a few veins from the left side of the liver. The vena umbilicalis which took origin from a single placenta entered the liver at the tranverse fissure, and forthwith divided into two branches, one of which proceeded to the right lobe the other to the left: the right gave off in the first place a large vessel—the ductus venosus (painted white) which opened directly into the vena cava abdominalis—and proceeded thence to ramify in the liver; that on the left on the contrary gave no ductus venosus—it had no communication with the venæ hepaticæ going to the left heart—all its branches were distributed to the substance of the liver. Of the venæ hepaticæ there were two sets—one joined the vena cava and ductus venosus leading to the right heart—the other passed as an unconnected trunk to the left heart. That the umbilical vein sent blood to the right heart alone by a

ductus venosus, and not to the left, was demonstrated by the course of injection thrown into it : the fluid first filled all the cavities of the right heart, and then only reached the left by passing from the right aorta into the left by the great branch of anastomosis at the pelvis, and thence in a retrograde direction through the left aorta to the corresponding heart, the cavities of which now became filled.

Notwithstanding this unequal distribution of the maternal blood to the two fœtuses, thus so distinct in the anterior parts of their bodies, they were both equally developed and equally perfect in these parts—a fact which tends to subvert the theory of Sabatier regarding the influence of the placental blood on the growth of the fœtus in utero.—J. H.

B. *c.*372. The mesentery of a seal (*ph. vitul.*). The branches of the mesenteric artery form a single series of anastomoses previously to their distribution in the coats of the intestine.—J. H.

B. *c.* 373. This preparation shows the arterial system of a hedge-hog (*erinaceus Europæus*). The arteries of the skin and those of the strong muscles which connect the integuments to the body are particularly demonstrated.—J. H.

B. *c.* 374. A successful injection of the arterial and venous system of the porpesse (*delph. phocæna*). The head, chest, abdomen, and right anterior extremity are preserved. The arterial system is injected red, the venous blue. The vena cava abdominalis, and venæ hepaticæ are vastly dilated as they approach the heart. A congeries of convoluted veins rests under the peritoneum in many parts of the abdomen, and of these a few have been preserved. The spinal canal is laid open to show the venæ rachidianæ which are of such great size, as when thus injected, nearly to fill up the spinal canal. A right and left vena innominata, formed by the union of the corresponding subclavians and jugulars, constitute the vena cava anterior which is short and not so much dilated as the abdominal cava. The right auricle and ventricle together with the pulmonary artery and its two branches leading to the lungs are filled with green injection ; the pulmonary veins with the left auricle and ventricle are injected red. The arch of the aorta is short and furnishes two arteriæ innominatæ, from each of which a subclavian and carotid with their respective branches are shown to take origin. A mass, consisting of numerous small arterial branches singularly convoluted together, fills up the intercostal spaces near the spine, and extends among the processes of the cervical vertebræ : the injection which has entered and filled these

vessels renders them obvious. The thoracic and abdominal aortæ occupy their usual position along the front of the spinal column, and to the left side of their corresponding venæ cavæ.—J. H.

B. *c.* 375. The kidney of a seal (*ph. vitul.*) injected and dried. A vast number of large veins lie on the surface of the organ, and form with each other a close net-work of anastomoses : these veins are filled with green wax.—J. H.

B. *c.* 376. The foot of a fœtal calf injected red. The horny hoof has been removed to expose the vascular and sensible hoof underneath, which is formed into beautiful perpendicular laminæ adapted to similar laminæ on the inside of the horn, shown at D. *e.* 883-4.—J. H.

B. *c.* 377. A perpendicular section of an injected foot and tarsal joints of a fœtal foal. It shows the thin layer of the vascular hoof interposed between the bone constituting the last phalanx, and the horny lamina of the exterior insensible hoof.—J. H.

B. *c.* 378. The foot and part of the leg of a fœtal foal : the arteries have been injected red, the veins yellow, and the whole dried and varnished.—J. H.

B. *c.* 379. A dried injection of the heart and blood-vessels of a seal (*phoca vitulina*)—the arteries red, the veins yellow. There is nothing very remarkable in the distribution of the arteries ; their size is, however, somewhat diminutive. The whole venous system presents a most singularly striking exhibition. The vena cava abdominalis is of very inordinate size : the venæ hepaticæ which join the former near the right auricle of the heart are dilated into vast reservoirs for the blood : the veins in the spinal canal, extending its whole length, and two in number, were of such a size when injected that in order for the exhibition of one, the other was obliged to be removed : on the back part of the neck there is a mass of huge vessels, coiled and twisted together in a very unique manner.—J. H.

B. *c.* 380. An injected preparation showing the vena azygos, with some of the rachidian and cervical veins of a seal (injected green). The azygos is very large, being the channel through which the blood of many of the great veins in the neighbourhood is conducted to the vena cava superior.—J. H.

B. *c.* 381. The blood-vessels, gall bladder and ducts of the liver of a seal injected and dried. In this preparation the great disproportion between the venæ hepaticæ and the other vessels of the liver is well shown. The hepatic artery, filled

with red wax, is very small and divides into two at the place of its junction with the liver; the vena porta, injected green, bears the usual proportion in size to the artery; the venæ hepaticæ, to be known by the yellow wax, appear as a great bag with three projections from it representing the off-sets from the bag which passed into the lobes of the organ. The gall bladder and its ducts are small.—J. H.

B. *c.* 382. A wet preparation of the liver of a seal, showing the dilatations formed in its substance by the hepatic veins—dilatations which extend to the extremities of its lobes.—J. H.

B. *c.* 383. The heart and principal blood-vessels of an otter (*lutra vulgaris*) injected and removed from the body. The preparation shows a dilatation in the hepatic veins like that in the same vessels of the seal, though not to such an amount. The venæ cavæ and innominatæ exhibit a like tendency to enlargement.

These great dilatations in the venous system leading to the pulmonary cavities of the hearts in these animals serve, no doubt, the purpose of temporary reservoirs for the blood, when prevented passing on freely through the lungs during the long continued periods of submersion to which the animals are accustomed—J. H.

B. *c.* 401. The circulation in the common heron (*ardea cinerea*). The venous system is injected blue, the arterial red. The general course of the blood through the different cavities of the heart and through the arteries and veins is the same as in the mammalia; and the most remarkable differences, arising out of the number and course of the blood-vessels, are pointed out in this and the following preparations. The pulmonary arteries are smaller than in mammalia. The aorta divides at once into three trunks of nearly equal size; that most to the right curves backwards and becomes the posterior aorta; the other two are, properly speaking, arteriæ innominatæ.—J. H.

B. *c.* 402. An injected preparation showing the heart, arteries and veins of a domestic fowl (*gal. domest*). The distribution of the aorta is the same as in the heron; see B. *c.* 401. The carotids run in bony canals formed by spinous processes on the front of the cervical vertebræ. The femorals arrive at the thighs by passing through the sciatic notches of the pelvis.—J. H.

B. *c.* 403. The circulation in the curlew (*scolopax arquata*). The injection is the same; and the preparation exhibits nearly the same points in the distribution of the vessels as the preceding.—J. H.

B. *c.* 404. The arteries of the head and neck of a goose (*anas anser.*) injected. The course of the carotids along the osseous channels in the neck, and the final distribution of their branches on the head are well shown.—J. H.

B. *c.* 405. The arteries and veins in the wing of a goose (*an. anser.*) injected. The axillary artery, accompanied by its veins, becomes brachial, and subsequently divides into radial and ulnar. The radial sinks deep into the interosseous space, whilst the ulnar, which is the larger and more direct trunk, runs in among the phalanges and sends little branches to the pulps of the quills ; but neither the ulnar nor radial make arches towards their termination like those formed by the same vessels in the mammalia.—J. H.

B. *c.* 406. The circulation in the leg of a goose. There are two arteries sent from the aorta to each of the posterior extremities : the first, the arteria profunda, arises opposite the sacrum and passes onwards near the cotyloid cavity to be distributed to the adductor and extensor muscles of the thigh—the second is the true femoral ; it goes out at the back part of the thigh through the sciatic notch, and accompanies the nerve of that name to the popliteal space : it then gets on the fore part of the leg by running between the tibia and fibula ; and descends thence in a groove on the front of the metatarsal bone, between the articular pullies of which the vessel again sinks back, to reach by its subdivisions, the inferior surface of the phalangeal bones.—J.H.

B. *c.* 407. An injected preparation showing the circulation in the great northern diver (*colymbus arcticus*). The vena cava abdominalis is vastly dilated, and near its entrance into the right auricle forms a distinct bag, larger than that of the auricle itself. The venæ hepaticæ are very much wider than they are ever found in birds not accustomed to diving.—J.H.

B. *c.* 408. A dried preparation of the heart and blood-vessels in a gannet (*anser basanus*). In the gannet, which nearly equals in size the diver, there is not that inordinate dilatation of the great veins leading to the heart, so remarkable in that bird. Although the gannet lives on fish, its food is taken by a mode different from that adopted by the diver. Like the eagle, it pounces suddenly on its prey from a height, when discovered near the surface of the water, and then carries it up to some dry spot, impaled on its strong, sharp bill. It is not habituated like the diver to lengthened stoppages under water, and stands not in need of those provisions, so amply given that bird by nature, to obviate the derangements which its circulating and respiratory organs might be exposed to, during protracted efforts of submersion.—J. H.

B. *c.* 425. The circulation in the cod-fish (*gadus morrhua*). The injection of the arterial system is red, that of the venous green. The heart, consisting of a single auricle and single ventricle, is placed in the centre between the gills, and on the lower surface of the œsophagus. The auricle receives the venous blood from the body, and the ventricle propels it into the pedicle with which the pulmonary artery is continuous: this vessel runs forwards and ends by sending an equal number of branches to each side, corresponding to the number of gills. From the opposite or dorsal extremities of the branchiæ a like number of roots arise: these, from both sides, join together after a short course, and form a single vessel—the aorta, which without having any connection with the heart, courses along the centre of the vertebral column and distributes branches to the organs it passes by.—J. H.

B. *c.* 426. An injected preparation of the circulation in a cod-fish. The œsophagus has been taken away in order that a clearer view might be given of those vessels (analogous to the pulmonary veins of mammalia) which take origin from the dorsal ends of the gills, and by their coalition form the aorta.—J. H.

B. *c.* 427. The gills of a cod-fish, injected and removed from the body. Every thing has been dissected away except the terminations of the pulmonary artery, and the roots or origins of the aorta which are shown to run parallel, though in opposite directions, in the grooves on the convex borders of the osseous laminæ of the gills. The former may be known by their red, the latter by their yellow colour.—J. H.

B. *c.* 428. The gills of a cod-fish (*gadus morrhua*) exhibiting the roots of the aorta injected yellow. The origin and course of all the branches, and their mode of coalition into a single trunk are clearly shown.—J. H.

B. *c.* 429. The tail of a cod-fish, showing the course, and relative position of the aorta and vena cava between the roots of the spines on the lower surface of the caudal vertebræ.—J. H.

B. *c.* 430. One of the branchiæ of a cod-fish prepared by an injection of size, coloured red, and preserved in spirits. It shows satisfactorily the exceedingly vascular nature of the organ.—J. H.

B. *c.* 431. An instructive preparation of the circulating vessels in the branchiæ of a sturgeon (*acipenser sturio.*) The respiratory organs and a portion of the spine have been removed from the body. The ramifications of the pulmonary artery are distinguished by red, the roots of the aorta by yel-

low injection. The pulmonary artery divides into ten branches, five on each side, in accordance with the number of gills : each branch runs along a groove in the cartilaginous basis of the gill, and as it progresses gives offtwigs to each of the laminæ of which the gill is composed. The roots of the aorta distinguished by their yellow colour, arise by long fine twigs from the laminæ of the gills, in precisely the same manner as that in which the pulmonary artery is distributed on them, and by exactly similar numbers : these roots soon run together into a single trunk which glides into a canal in the bodies of the vertebræ, further shown at 432, 433. The coronary artery of the heart, a branch filled with yellow injection, may be noticed running backwards along the side of the pedicle, in the direction of the heart. It is one of the first branches given off by the aorta.—J. H.

B. *c.* 432. A portion of the vertebral column of a sturgeon, showing the canal in which the aorta is embedded. This canal is at first shallow, and only partially encloses the vessel—by degrees it becomes deeper, and about four inches back disappears altogether by being enveloped in the cartilaginous structure of the vertebræ.—J. H.

B. *c.* 433. A transverse section of one of the dorsal vertebræ of a sturgeon, showing the form and position of the aortic canal. It is flattened in the antero-posterior direction so as to take the form of a transverse slit. It lies in front of the canal for the spinal marrow, which the preparation shows to be small in comparison and circular. None of the coats of the artery except the serous membrane appear to have entered the tube : its cartilaginous walls are lined by a delicate membrane which cannot be removed from them by dissection.—J. H.

B. *c.* 434. The circulation in a ray (*raja batis*). The heart, injected green, is shown in situ. The subdivisions of the pulmonary artery, and the origins of the aorta from the gills are clearly shown. The course of the aorta down the back, and the branches which it gives off to the intestinal tube, the head, and the great pectoral fins are all demonstrated.—J. H.

B. *c.* 435. A successful injection of the circulation in a ray. The pedicle and pulmonary artery are yellow, the aorta and its branches red.—J. H.

B. *c.* 436. The circulation in a shark (*squalus galeus*): all the important features connected with the circulation of the blood in this class of animals are here demonstrated. The cavities of the heart have been successfully injected and the

branches of the pulmonary artery dissected to their terminations in the branchiæ. The roots from which the aorta takes origin (ten in number), and the course of that vessel into the body, without the agency of any muscular heart to propel forwards its contents, is made particularly manifest. Several of the aortic branches, to the viscera, &c. are shown.—J. H.

B. *c.* 437. The caudal vertebræ of a frog-fish (*lophius piscatorius*). The aorta and vena cava, injected—the one red, the other yellow, run in a straight course between the roots of the abdominal spines. Several of the branches which supply blood to the muscles of the tail, are shown coming out through the intervertebral spaces.—J. H.

C. *a.* 10. The larynx of a monkey (*simia sabæa*). A large membranous sac is placed under the epiglottis, which communicates by a narrow passage with the cavity of the larynx: the opening of communication may be seen below the root of the epiglottis. There is a well marked laryngeal ventricle on each side between the cordæ vocales.—J. S.

C. *a.* 11. The larynx, trachea, and thyroid gland of a monkey (*simia flavescens*). The muscles of the cartilages are shown. The thyroid gland consists of two lobes, connected together by a narrow slip on the fore part of the trachea.—J. H.

C. *a.* 12. A section of the lung of a panther (*felis pardus*), dried and preserved in turpentine. The size of the air cells may be learned by inspection of them with a glass. A few absorbents on the surface of the lung have been injected with quicksilver; the arrangement of their trunks and branches is arborescent.—J. S.

C. *a.* 14. A section of the trachea of a lioness (*felis leo*). The muscular fibres under the mucous membrane are very distinct; they run transversely. Similar fibres were observable, in the recent state, in the finer ramifications of the bronchial tubes.—J. S.

C. *a.* 16. The larynx of a dog. The os hyoïdes and cartilages of the larynx are cleanly dissected: the cordæ vocales and ventricles are shown.—J. S.

C. *a.* 19. The larynx of a porcupine (*histrix cristata*). There are no cordæ vocales or ventricles: the arytenoïd

cartilages form a thick brim at the opening of the larynx.-J.S.

C. *a.* 22. The tongue, larynx, and trachea of a spotted cavy (*cavia paca*). The epiglottis rises above the velum palati, and causes the opening of the glottis to present itself at the posterior nares.—J. H.

C. *a.* 23. The larynx, tongue, and trachea of a hedge-hog (*erinaceus Europæus*). The arrangement of the opening of the glottis with respect to the velum and posterior nares is the same as in preparation C. *a.* 22.—J. H.

C. *a.* 26. The lung of a rein-deer (*cervus tarandus*). The cells are collected into clusters, which, in the preparation, are detached from each other, and shown to be perfectly separate and distinct—a fine cellular tissue being their only connecting medium.—J. S.

C. *a.* 27. The larynx of a rein-deer (*cerv. tarand.*). It possesses a small laryngeal sac.—J. S.

C. *a.* 28. The lungs and heart of a fœtal calf. The pleura has been removed from the left lung to exhibit the lobulated arrangement of the air cells. A cluster of cells is appended to each of the ultimate radicles of the bronchial tubes. The cavities of the heart are exhibited in the preparation.—J. H.

C. *a.* 32. A portion of the trachea of a horse, showing the mode in which the cartilaginous rings overlap each other posteriorly, and the application of a strong layer of transverse muscular fibres for altering the calibre of the tube.—J. S.

C. *a.* 33. A section of the lung of a whale (*delphinus diodon*). It is solid and heavy ; the air cells are very small ; and the pleura remarkably thick. A strong capsule lies between the lung and the pleura.—J. S.

C. *a.* 34. The larynx and trachea of a whale (*delph. diod.*) dried. The epiglottis and arytenoïd cartilages rise up towards the blow-hole like a funnel, and ascend considerably above the posterior opening of the mouth.—J. S.

C. *a.* 35. A portion of the lining membrane of the trachea of a whale (*delph. diod.*). It is white, and remarkably thick, and rugous.—J. S.

C. *a.* 36. A wet preparation of the larynx of a porpoise (*delphinus phocœna*). The arytenoïd cartilages and epiglottis form a remarkable projection in the pharynx, ascending funnel-shaped towards the blow-hole. The valve of the anterior nares or blow-hole is exhibited by suspension at the top of the bottle. The tongue, the thyroid and cricoid cartilages, the os hyoïdes, the thyroid gland, and a part of the trachea are shown in the preparation.—J. S.

C. *a.* 37. The lung of a porpoise (*delph. phoc.*) injected,

and preserved in spirits. The bronchial tube is slit open to show the mucous membrane.—J. S.

C. *a.* 38. The lung of a porpoise (*delph. phoc.*) without being injected. It demonstrates the small size of the air-cells, and exhibits a fatty appendage attached to the thin margin of the lung.—J. H.

C. *a.* 81. The trachea of a swan (*anas cygnus*) in situ. It makes a singular contortion in the substance of the sternum previous to its entrance into the chest and lungs : a layer of the sternum has been removed to expose its windings.—J. S.

C. *a.* 83. The lower extremity of the trachea, and the pulmonary tissue of a peacock (*pavo cristatus*). The lower extremity of the trachea is provided at its bifurcation with a true larynx, the seat of the sounds of the voice in birds : the tube at this place is narrowed and divided into two rimæ, the borders of which are furnished with membranes susceptible of tension and relaxation, and of varied vibrations : it is termed the inferior larynx of birds : the cartilaginous rings of the bronchi differ in form and direction from those of the trachea, and disappear almost as soon as the tubes reach the lungs. The pulmonary tissue does not present the lobulated arrangement observable in the lungs of mammalia : the cells are also larger and more distinct : the bronchi do not run into suchfine ramifications ; they terminate moreabruptly ; and many of them open on the surface, which is therefore pierced like a sieve, allowing the air to pass into the great cells of the wings, chest and abdomen. There is no distinct serous membrane or pleura, enveloping and insulating the whole lung—J.H.

C. *a.* 84. One of the lungs of a swan (*anas cygnus*). By frequent ablution in water, the cells which are naturally large have been rendered very distinct : the terminations of the bronchus on the inside of the lung, and the openings on the outer side by which the air passes into the great accessary vesicles are all demonstrated—J. H.

C. *a.* 85. The lungs of a curlew (*scolopax arquata*) detached from the body, and well washed. The cells are very distinct and beautiful.—J. H.

C. *a.* 86. The trachea, larynx and tongue of a parrot (*psittacus cinereus*). The muscles of the inferior larynx have been rendered plain by dissection.—J. H.

C. *a.* 87. The larynx, trachea, and os hyoïdes of a woodpecker (*picus minor*). There is exhibited in this preparation a singularity in the construction of the os hyoïdes, by which the animal is enabled to dart out its tongue with rapidity and force: see A. *a.* 135.—J. H.

C. *a.* 91. The tongue and superior larynx of a male ostrich (*struthio camelus*). The tongue is very short from before backwards, and broad in the transverse direction : it lies like a thin semilunar plate in the back part of the mouth, supported on a lamina of cartilage derived from the body of os hyoïdes : it is devoid of papillæ, but covered on both surfaces with numerous small glandular orifices. The rima glottidis is in the form of a wide triangular slit, bounded laterally with two cartilages or bones covered with mucous membrane, remote from each other anteriorly, and meeting at an angle behind, without epiglottis or arytenoid cartilages. There are no ventricles in the larynx. The cornua of the os-hyoïdes are long, tapering, and jointed in several places. Two long, flat muscles, arising from the larynx, descend in intimate connection with the sides of the trachea, see 92, 93.—J.H.

C. *a.* 92. The lower larynx of a male ostrich, with a portion of the trachea, and portions of both bronchial tubes. About five inches of the lower part of the trachea, adjoining the inferior larynx, is wider and of a more rounded shape than any other part of the tube : the cartilaginous rings of which this part is formed are also narrower, more closely applied to each other, and less capable of motion, than those elsewhere in the trachea. The line between this portion of the tube, and that next above is marked by the insertion of two strong, lateral sterno-tracheal muscles ; and by three narrow slips of muscle with intersecting tendons, which lie at this point in a transverse direction across the tube. A firm circular ring marks the place of the inferior larynx, and gives attachment to the bronchial tubes. The rings of the trachea are complete, those of the bronchi go only partially around these tubes. There are no proper muscles to the inferior larynx.—J. H.

C. *a.* 93. A dried preparation of a part of the trachea of an ostrich. The rings are uniformly about one line in breadth ; they are flattened, and encircle the tube : the calibre of the preparation is the same at both ends, but it is somewhat more flattened in the antero-posterior direction at the extremity next the superior, than at that adjoining the dilation near the inferior larynx. The dried, longitudinal tracheal muscles are very evident on the sides of the cartilaginous rings.—J. H.

C. *a.* 94. One of the lungs of an ostrich (*struthio camelus*) from which the capsule has been removed, and all the blood well discharged. The air cells are shown to be very large ; and seven or eight wide holes appear on the outer surface—

passages, directly continuous with the bronchial tubes, and by which the air finds admission into the great lateral cells. The bronchial tubes lose their cartilaginous rings upon entering the body of the lung, but acquire in stead a well marked stratum of red, thickly set, transverse muscular fibres which are traceable through the holes on the outer surface, above alluded to, into the commencement of the lateral cells. The preparation demonstrates also three broad slips of muscle, each as fleshy and as red as an ordinarily sized tensor vaginæ femoris, and which in the connected state of the parts extended from the ribs of the corresponding side to be inserted into the fibrous capsules of the lung, heart, and liver, and also to be continuous with a central tendon common to that of the side opposite--making by their attachments and functions a true diaphragm.—J. H.

C. *a.* 121. The lung of a turtle (*testudo mydas*) minutely injected, inflated, and preserved in turpentine. It is highly vascular : its cells are very large, and have free communications with each other.—J. S.

C. *a.* 122. This preparation shows the distribution of the bronchus in relation to the lung of the turtle. It runs to the extreme end of the lung—diminishing as it progresses : its sides are perforated with holes, by which the communication with the air-cells is established : the holes are all much of the same size and form.—J. S.

C. *a.* 123. The trachea of a turtle. It divides into two branches : its cartilaginous rings form complete circles, having no joints by which dilatation or narrowing of the tube could be accomplished.—J. S.

C. *a.* 124. The trachea and lungs of a turtle filled with plaster-of-paris. This mode of preparation conveys a good idea of the form of these cellular organs.—J. S.

C. *a.* 127. The trachea and one of the lungs of a turtle (*testudo mydas*) macerated, and well washed. The structure and arrangement of the air-cells, and the mode by which the bronchial tube terminates on them are well shown.—J. H.

C. *a.* 138. The lungs of a snake. There is one mass of pulmonary tissue which extends through the whole length of the chest and abdomen : the heart occupies a position nearly in the centre of its length : the portion of the lung anterior to the heart is vascular and exhibits numerous small cells ; the part posterior to that organ appears little endowed with vascularity, and presents but a single cell of great size, intersected slightly with fine membranous fibrillæ.—J. S.

C. *a.* 139. The anterior half of the lung of a rattle-snake

(*crotalus horridus*). It exhibits a beautifully porous, cellular structure : the trachea runs along one side of the lung, and communicates with the air cells by numerous foramina which are exhibited in the preparation. Towards the posterior or caudal extremity of the lung the cells enlarge, and gradually end in great membranous sacs, having all the characters of serous cavities, which pass among the viscera even as far back as the cloaca.—J. H.

C. *a.* 140. The larynx and tongue of a rattlesnake. The cartilages of the trachea are complete rings : the larynx has been cut open to show its want of ventricles : the rima glottidis forms a vertical slit : the tongue is horny, bifid, and enclosed in a fibrous sheath : the os hyoïdes appears as two narrow longitudinal pieces of cartilage lying on the sheath of the tongue, and connected to it by muscles.—J. H.

C. *a.* 141. The trachea and lungs of a *boa constrictor.* The trachea terminates very abruptly at the anterior part of the lung : its rings do not enter at all into the texture of the organ : the lung is divided into two compartments, which lie parallel, and are connected by a middle septum. The texture of the lung is firm and fleshy looking, anteriorly ; posteriorly it is membranous and soft : in front it is formed into numerous cells which open into a central common cavity, and which appear lined with mucous membrane ; behind, the cellular structure disappears, and the organ assumes the characters of a serous bag, exhibiting no traces of cells except a few widely scattered reticulated filaments on the inner surface of the bag ; see C. *a.* 142. Great numbers of long fine worms occupied the cells, among which they were so entangled as to break in being pulled out : a few of these worms have been left in the preparation for exhibition.—J. H.

C. *a.* 142. The posterior extremity of the lung of a *boa constrictor,* dried and preserved in spirits of turpentine : it is in the form of a large membranous or serous bag, with little or no subdivision into cells. It is part of the same lung as that in preparation marked C. *a.* 141.—J. H.

C. *a.* 147. The lungs of a frog (*rana temporaria*) injected, inflated, and preserved in spirits of turpentine. They form two sacs, the interior walls of which are divided by numerous laminæ into cells, which again are subdivided into smaller cells by finer and shorter laminæ : the cells are smaller and more numerous at the anterior part of the lung than at the posterior, where the intersecting laminæ become larger and more scattered. The trunks, and finer ramifications of the

blood-vessels on the surface of the lung are rendered very evident by having been successfully injected.—J. S.

C. *a.* 159. One of the gills of a frog-fish (*lophius piscatorius*) injected red. The branchiæ, or gills of fish are their proper respiratory organs; and the arterialization of the blood is accomplished in them in the same way that this change in its qualities is effected by the atmosphere in the lungs of animals which live and breathe in air. In both cases the blood is conveyed into the respiratory apparatus by vessels which divide to great minuteness, in order that all parts of the fluid may be sufficiently exposed to the action of the respiratory medium. This preparation affords a good exhibition of the structure and form of the branchiæ in cartilaginous fish. It is composed of two rows of numerous, fine, thickly set, cartilaginous laminæ, placed parallel to each other; united back to back by a middle septum; fixed by one end to the cartilaginous arch or frame work; free by the other; and serving as a support for the ultimate ramifications of the pulmonary artery and origins of the aorta, the injection of which has given the beautiful red colour to the preparation. The trunks of the vessels to which these fine twigs belong are to be found in the grooves of the cartilaginous arches. (see C. *a.* 160; B. *c.* 227-28-34-36.)—J. H.

C. *a.* 160. The cartilaginous arch of one of the gills of a frog-fish. Its concave edge is toothed or serrated, the convex gives attachment to several cartilaginous styles, which run in a radiating direction towards the convex border of the gill, serving as a septum between the lateral rows of laminæ, and establishing that attachment to the integuments over it which procures for this kind of branchia the term *fixed*.—J. H.

C. *a.* 161. The gills of a haddock (*gadus æglifinus*) injected, and preserved entire. The gills of each side are four in number: they are supported on osseous arches, which are covered on their concave edges with rough, sharp eminences termed branchial teeth, and by their convex borders, afford attachment to the cartilaginous laminæ: the convex borders of the gills are unattached and moveable, affording a specimen of *free* branchiæ. The gill-covers, two half-moon-shaped bony plates, attached, one to each side of the head in front of the gills and covered by skin, are shown in the preparation—J.S.

C. *a.* 162. A portion of the gills of a hollybut (*pleur. hippoglossus*) showing their connection with the bone which supports the tongue.—J. H.

C. *a.* 163. One of the gills of a hollybut, injected. The osseous arch is covered on its sides and concave edge by a

firm, white, mucous membrane, which is continuous with that in the pharynx, and rendered uneven in some parts by roughened, sharp projections termed branchial teeth : from its convex border stand out the fine cartilaginous laminæ on which the beautiful vascular membrane, the seat of the respiratory function, is expanded. The continuity of this membrane with the general mucous surface is very striking ; and its abrupt and singular change of character is not less remarkable.—J. H.

C. *a.* 164. One of the osseous arches which support the gills of a hollybut. Its concave border is smooth and rounded ; its convex border is furrowed by a deep groove for giving lodgment to the branch of the pulmonary artery which conveys the venous blood to the vascular membrane, and also to a corresponding vessel, which, having received the purified fluid, becomes one of the roots of the aorta. The free course of the aortic blood from this place through all parts of the body renders it probable that the gills serve, not merely the purpose of respiratory organs, but also act as so many hearts, placed at the origins of the great arteries, and imparting a quickened movement to the fluids which circulate along their branches.—J. H.

C. *a.* 170. The swim-bladder of a sturgeon (*acipenser sturio*). These singular organs, possessed by the generality of fishes, are considered by some physiologists as subservient to the respiratory function, and may, therefore, have a place here. They are the seat of the secretion of a gas, which, while it contributes to the buoyancy and fleetness of the fish under water—most probably its principal use—may in addition serve as an emunctory for the discharge of noxious particles from the blood ; and it is a matter of observation that the air contained in these bags always exhibits the qualities of such as has been breathed in by animals, viz. air surcharged with azote or carbonic acid. The preparation before us exhibits the swimming-bladder of a sturgeon, preserved in spirits. It is of great size ($2\frac{1}{2}$ feet long by 6 inches in diameter) : it is injected, and everted so as to show the appearance of its inner surface : its walls are thick, and strong. It opens by its anterior extremity into the stomach : the passage of communication is wide, and devoid of any intermediate duct, but is furnished with a sphinctor muscle, to controul the ingress and egress through a door between two compartments, holding such different contents, and destined for such distinct purposes.—J. H.

C. *a.* 171. The swim-bladder of a pike (*esox lucius*). It

is of great size—being nearly as large as the stomach—and communicates with the œsophagus by one short, narrow canal.—J. H.

C. *a* 172. The swimming bladder, and a part of the œsophagus of a cod-fish (*gadus morrhua*) demonstrating the fact, that, in this fish, there are two openings of communication between the organs, each of small size, and formed of strong tendinous walls.—J. H.

C. *a*. 133. The swimming bladder of a gurnard (*trygla lyra*). The bag is large; it is divided into three compartments like the fingers of a glove; and opens into the œsophagus.—J. H.

C. *a*. 134. The swimming-bladder of an eel, so prepared by injection, as to demonstrate the great size, and number of the blood vessels which ramify on its internal membrane, and which are looked upon as the source of the secretion of that deoxygenized air, with which the bag is always filled.—J. H.

C. *a*. 180. The respiratory apparatus of a cuttle-fish (*sepia loligo.*) The branchiæ of the cuttle-fish are enclosed in the cavity of the body, and water finds admission to them through a funnel, or infundibulum placed under the neck. The water is renewed on the branchiæ by the dilatation and contraction of the muscular sheath of the body, which causes it to enter, or escape from the funnel. The mass of each gill is pyramidal; its base, near the centre of the body, is attached by the pulmonary artery and vein to the heart (see B. *b*. 270); its apex looks forwards to the infundibulum: one side is attached to the sheath of the animal, the other is free, and exhibits numerous laminæ placed parallel to the base of the pyramid, on which the pulmonary vessels are ramified.—J. H.

C. *a*. 181. One of the branchiæ of a cuttle-fish (*sepia loligo*), prepared and exhibited without injection. The delicacy and beauty of the structures entering into the composition of this organ can be only appreciated by a close inspection. None of the textures of the human body strike the beholder with so much of admiration, as do these, and many other such instances of organic formations, in the lower tribes of animals.—J. H.

C. *a*. 190. The pulmonary organ in one of the gasteropodous mollusca, breathing air—the garden snail (*helix hortensis*). There is a cavity under the neck, the entrance to which is pointed out by a bristle: the walls of the cavity can be seen, in the fresh state, covered with a net-work of fine vessels.

The size of the cavity, and that of the entrance leading thereto are regulated by muscular contraction.—J. H.

C. *a.* 191. The respiratory apparatus of a garden slug (*limax ater*). There is a single cavity under the neck, with one opening which may be noticed a little to the right side of the organ.—J. H.

C. *a.* 194. This preparation gives a view of the organ for arterializing the blood in one of the gasteropodous mollusca inhabiting the water, the whelk (*buccinum undatum*). The branchiæ form two long series of transverse laminæ, one large, the other small, which are concealed under the margin of the shell, and to which the water is conducted by a membranous tube, a prolongation of the cloak, lodged in a groove in the shell.—J. H.

C. *a.* 195. A murex shell, (*murex scorpio*), showing the narrow deep groove in which the respiratory tube is lodged.—J. H.

C. *a.* 200. The gills of a scallop (*pecten maximus*). There are four large plates, two under each shell inside the cloak, composed of a series of parallel vessels running across the long axis of the plates : the trunks of these vessels, arterial and venous, run along the fixed attachments of the branchiæ. The mouth is also surrounded by four triangular plates, striped with vessels like the branchiæ, and contributing, perhaps, to the purposes of respiration. These gills are exposed to the action of the water, at all times that the shell is open.—J. H.

C. *a.* 201. The gills of an oyster (*ostrea edulis*). Four large pectinated plates, situated inside the cloak, fixed by one margin, free by the other, and seen as soon as the shell is opened, constitute the respiratory apparatus.—J. H.

C. *a.* 202. The gills of a fresh-water mussel (*unio pictorum*). Four small gills lie around the mouth, like lips ; and two other larger pairs are placed towards the back of the animal.—J. H.

C. *a.* 220. The respiratory organ of an earth worm (*lumbricus terrestris*). It consists of two rows of small holes on the back—one on each ring of the body : these holes lead into little oval respiratory vesicles placed beneath the skin, and attached by fine filaments to the sides of the intestinal tube.—J. H.

C. *a.* 221. The lungs of a leech (*hirudo medicinalis*). A row of minute apertures or stigmata, on each side, form the entrances to the respiratory vesicles, which are shown on the inside of the skin, lying parallel to the intestinal canal—J.H.

C. *a.* 222. A lug-bait (*lumbricus marinus*) showing the hairy tufts which surround the openings in the external integument leading to the respiratory vesicles.—J. H.

C. *a.* 223. The respiratory apparatus in the sea-mouse (*aphrodita aculeata*) constitutes a remarkable part of this little animal. The stigmata, placed along the sides of the body, are very large and surrounded with tufts of stiff hair: the cœca, to which the stigmata lead, are long and conical, and lie loose in a cavity under the skin of the back, to which the water finds free admission by an opening near the tail of the animal.—J. H.

C. *a.* 230. A preparation showing the branchiæ of a crab (*cancer mœnas*). These organs are placed inside the dorsal shell: they consist of seven pyramidal bodies on each side, attached by their bases, and free at their apices: the body of each pyramid is formed of a great number of transverse laminæ, and along the margins of each run the great vessels by which the blood is conveyed to, and from the organ: see A. *b.* 631.—J. H.

C. *a.* 240. The organs of respiration in the star fish (*asteria rubens*) are shown in this preparation. They consist of a number of small, cylindrical, and ostensible tubes arranged along the centre of the lower surface of the arms. When seen in the living animal, in its natural element the water, these tubes are very conspicuous and beautiful.—J. H.

C. *a.* 241. The respiratory organs of a sea-urchin (*echinus eschulentus*). Long, fine tentacula exist all over the surface of the body for the absorption of water for respiration. These tentacula may be looked upon as the first indication of gills, in beings of this tribe.—J. H.

C. *a.* 250. A very large actinea (*act. anemone*) showing the respiratory tentacula in great numbers about the mouth. When these tentacula are seen in the living animal under water, they appear long, moveable, and contractile: and become empty or full of fluid at the will of the animal, the slightest touch of the finger causing them to squirt out their contents, and retire, so as to become almost invisible.—J. H.

C. *a.* 251. An actinea (*actinea dianthus*). The respiratory tentacula are here well preserved; for although much of that plumpness and delicacy of colour, which renders them so very beautiful during life has been lost in the preparation, yet their length, form, and pliability are nevertheless clearly exhibited—J. H.

C. *a.* 252. Another variety of actinea (*actinea cereus*), in which the respiratory tentacula are much shorter, and finer than those of the actinea dianthus.—J. H.

C. *a.* 253. A large bunch of dead-men's-fingers (*alcyonium digitatum*) showing numerous small actineæ, in the form of tentacula, spread all over the surface of the mass. These actineæ are of various lengths, extensible, and contractile; and are fitted into foramina on the surface of the alcyonium, which alternately conceal them, or allow of their standing forth in the water. The power of imbibing and discharging water, possessed by those imperfect beings, is no doubt the source of the respiratory function, in the same manner that the arms of the more fully developed actineæ are the agents of its performance.—J. H.

C. *a.* 255. A large medusa (*medusa aurita*), showing the respiratory apparatus. There are four sacs on the under surface of the body, the openings of which, near the roots of the tentacula, are shown in the preparation. Water is taken into these apertures, during the expansion of the body in swimming, and again expelled from them, during the subsequent contraction.—J. H.

D. *a.* 1. This preparation gives a view of all the parts of the human brain in their place in the cranium, divided, in a vertical section, from ear to ear. It shows also the fourth ventricle, and the origins of many of the nerves; the origin and course of the spinal-accessary nerve is very clearly exhibited.—J. H.

D *a.* 2. The counter-part of the skull and brain, shown in preparation D. *a.* 1. The depth of the convolutions, and the fissure which separates the hemispheres; the position of the corpus callosum, velum interpositum and fornix; the form and extent of the third ventricle, &c. may be well understood from an examination of these two preparations.—J.H.

D. *a.* 4. An irregularity in the recurrent branch of the right pneumo-gastric nerve. In this case (that of a female child) the right subclavian artery comes off, the last branch, from the arch of the aorta, and passes behind the œsophagus to reach the right side; and the recurrent nerve which, under the natural arrangement of the artery, winds round that vessel in its course to the larynx, here separates from the pneumo-gastric half way up the neck, and passes thence straight inwards to its destination.—J. H.

D. *a.* 25. The brain of a monkey, preserved complete. By a comparison of the several brains exhibited in this section, it will be found, that this brain and others of the same tribe bear a much closer resemblance to that of the human subject, than do those belonging to the other classes. The hemispheres by their height, by their rotundity, and by the manner in which they cover over the cerebellum, surpass those of all the inferior animals. They are also, as in the human subject, divided inferiorly into three lobes, of which the middle forms a considerable projection downwards, and the posterior completely overlaps the cerebellum. The hemispheres are more allied to those of the inferior animals than to those of man, in the comparative freeness, and little depth of the convolutions, and in the total absence of such inequalities on the posterior lobe. In the monkey only, as in man, do the olfactory nerves arise by a medullary filament from the base of the brain; in most of the other animals (see D. *a.* 35.) the carunculæ mamillares give origin to the olfactory filaments. J. H.

D. *a.* 35. The brain of a dog. This preparation affords a good specimen of the form of the brain among the sarcophaga. The hemispheres are flattened superiorly: their anterior lobes form projections, termed carunculæ mamillares, from which the olfactory nerves take origin, and which contain cavities communicating with the lateral ventricles: the posterior lobes are wanting; which causes the cerebellum to appear uncovered behind the hemispheres: the prominence of the middle lobes in the base is inconsiderable: the convolutions on the cerebrum are neither numerous nor deep; and the laminæ of the cerebellum are divided into lobules, which gives them a resemblance to convolutions.—J. H.

D. *a.* 45. The brain of a guinea-pig (*cavia*), to show the peculiarities of the organ in the rodentia. The hemispheres are small, flat, and pointed in the anterior lobes; the posterior lobes are totally absent; there is no trace of convolutions on any part of the hemispheres; and on the base, the middle lobes scarcely project beyond the common level The cerebellum is laminated, and lies completely behind the cerebrum. This arrangement of the hemispheres, cerebellum, and pons, before each other, and nearly on the same horizontal level, gives to the whole organ a striking resemblance to the brain of a reptile, or that of a cartilaginous fish.—J. H.

D. *a.* 65. The brain of a seal (*phoca vitulina*). The hemispheres are thin; the fissure between them is shallow; and on the vertex and base they are flattened to nearly the

same degree : there are no posterior lobes : and the anterior form carunculæ mamillares. The cerebellum is divided into numerous lobules like convolutions, and in great part is uncovered by the cerebral hemispheres. The spinal marrow is shown lying at the bottom of the bottle.—J. H.

D. *a.* 68. The brain of a porpoise (*delphinus phocæna*). The hemispheres are marked by numerous and deep convolutions : superiorly, they are high and round ; inferiorly, they are divided into three lobes, the posterior of which completely covers the cerebellum : the anterior lobes are not prolonged into processus mamillares, for giving origin to the olfactory nerves, as in some others of the class mammalia. The cerebellum is laminated, and presents vermiform processes very like those of the human brain.—J. S.

D. *a.* 81. The brain of a sparrow-hawk (*accipiter nisus*). The hemispheres are of greatest breadth transversely : they are smooth and without convolutions : commissures connect them together : there is no division into lobes at their base : small processus mamillares afford origin to the olfactory nerves. The optic tubercles are very large : they project behind, and even rise as high as the hemispheres: the origin of the optic nerves from these turbercles in the base of the brain is shown. The cerebellum resembles a vermiform process ; it is laminated across and furnished with two small lateral appendages. The medulla oblongata is very large : it is convex below, and marked by pyramidal eminences.—J. H.

D. *a.* 82. The brain of an ostrich (*struthio camelus*). The organ is preserved in a very perfect state. The large vermiform appendages, which project from the sides of the hemispheres, and form a peculiarity in this bird, are clearly exhibited.—J. H.

D. *a.* 95. The brain of a *boa constrictor*. This brain resembles very much that of a cartilaginous fish, (see D. *a.* 102) in which the several parts are arranged in a line before each other. Its entire bulk is inconsiderable, compared with the size of the animal. The hemispheres are devoid of convolutions : they are broader than long ; and terminate anteriorly in thick club-like olfactory nerves. The optic tubercles appear behind them, like the anterior eminences of the corpora quadrigemina in man : the optic nerves decussate in the substance of these tubercles. Behind the optic tubercles, the cerebellum may be recognized in the form of a narrow, transverse, medullary band, covering the fourth ventricle. The medulla oblongata is large, like that in birds (see D. *a.* 81.), and convex and

prominent on the inferior surface. The origins of many of the nerves are shown in the preparation.—J. H.

D. *a.* 96. The brain and origins of the nerves of a rattle-snake (*crotalus horridus*). The anatomy of the several parts of the organ, and of most of the nerves which it gives origin to, is well shown in this preparation.—J. H.

D. *a.* 97. The brain of a young crocodile (*lacerta alligator*). The hemispheres are broad laterally, and end anteriorly in pointed olfactory tubercles : they are without convolutions, and separated by a vertical fissure : behind these are two optic tubercles, broad, rounded, partially separated from each other superiorly, and giving origin inferiorly to the optic nerves, at the junction of which there is a considerable accumulation of grey substance. The cerebellum lies behind the optic tubercles : it is of considerable size, and presents two lateral appendages, in which respect it makes an approximation to the form of the same part in birds. The medulla oblongata is very broad and flat : the fourth ventricle is wide, and leads down into the spinal marrow. The arachnoid membrane and pia mater are of a blackish colour.—J.H.

D. *a.* 102. The brain of a spotted shark (*squalus catulus*), detached from the cranium to show the conformation of the organ in cartilaginous fish. It consists of hemispheres, optic tubercles, cerebellum, and medulla oblongata, arranged on a horizontal plane, and not vertically over each other, as in man. The hemispheres form one great ganglion, without fissures, and without convolutions, and from the lateral, anterior angles of which, two large, soft, olfactory nerves take origin. There is a cavity—a rudiment of ventricles, in the centre of the hemispheric ganglion. The optic tubercles are inferior in size to the hemispheres, and placed completely behind them. The cerebellum lies still further back : it is laminated transversely—bearing in this respect an alliance to the brain of birds ; (see D. *a.* 81.). The medulla oblongata is large, flat, and hollowed by the depression of the fourth ventricle, which is continued into it from under the cerebellum.—J. H.

D. *a.* 104. The brain of a dog-fish (*squalus caniculus*) in situ. The preparation shows the small size of the brain in comparison with that of the cranium in which it is lodged : the pia mater is well marked and surrounds the brain closely : the place of the arachnoid membrane is occupied by a glairy gelatinous liquor, which is present in great abundance, filling all parts of the cavity unoccupied by cerebral matter : the dura mater lines the interior of the skull.—J. H.

D. *a.* 106. The brain and nerves of a torpedo (*raja tor-*

pedo). In the general conformation of the brain, there is not much to distinguish the organ from that of other cartilaginous fish ; but in the enormous size of the nerves which leave it for the supply of the electrical apparatus, it presents a striking peculiarity. The cranium has been laid open from above, and the semicircular canals of the right ear—together with a portion of the spinal marrow and its nerves, are all exhibited : the diminutive size of the latter, compared with those which go from the brain to the electric organs, cannot escape notice. The nerves which supply the electric organs are derived from the branchial and fifth pair—J. H.

D. *a*. 107. This beautiful preparation shows the brain, nerves, and electric organs of a torpedo (*raja torpedo*). All these parts, constituting a most singular variety of animal organization, are exhibited in connection with each other, and bearing their natural relative positions. The upper part of the cartilaginous cranium has been removed to expose the brain and the origins of its several nerves. The nerves for the electric machine are of enormous size—each of them being fully equal in thickness to the great sciatic in the human body : they run over the spaces between the arches of the branchiæ, and ramify among the electric tubes. The electric organ on the left side is preserved entire, that on the right is so dissected as to exhibit the distribution of the nerves through its substance.—J. H.

D. *a*. 108. One of the electric organs of a torpedo, injected, and stripped of its fibrous capsule. The form, the size, and the number of the laminated cylinders, of which the organ is composed, may be well understood from this preparation—*Presented by Dr. Jacob.*—J. H.

D. *a*. 109. A section of the electric organ of a torpedo. The length of the cylindrical tubes running from the dorsal to the abdominal surface of the organ, and the numerous delicate lamina which intersect these tubes, are clearly shown in this preparation. The size of one of the nerves, and its mode of distribution among the tubes and laminæ is also displayed.—J. H.

D. *a*. 110. The brain, nerves, and spinal marrow of a frog-fish (*lophius piscatorius*). The brain is remarkably small, and the cavity of the cranium large : the spinal marrow runs but a short way, and terminates by forming a cauda equina. A small ganglionic enlargement appears on one of the olfactory nerves.—J. H.

D. *a*. 112. A section near the termination of the caudal vertebræ of a sturgeon (*acipenser sturio*) prepared to show a

prolongation of the spinal marrow into the tail, and exhibiting a difference in this respect, between it and the frog-fish in which the spinal marrow is short, and terminates abruptly.—(see D. *a.* 110.—J. H.

D. *a.* 116. The brain of a cod-fish (*gadus morrhua*) removed from the cranium. The part which represents the hemispheres is much inferior in size to the same part in cartilaginous fish : (see D. a. 102.). The olfactory nerves are slender, and long, and arise near each other from the front of the hemispheres. The optic tubercles are larger than the hemispheres ; and are situated posterior to them : these tubercles are separated by a shallow fissure : they are identical with the anterior pair of corpora quadrigemina in man. The optic nerves are very large, and cross each other at a short distance from their origin. Underneath the optic tubercles are three elevations of medullary matter—a central, and two lateral ones ; the former gives attachment to the infundibulum, the latter resemble the tuber cinereum of the human brain. The cerebellum is a broad lamina of grey substance, situated behind the optic tubercles, and over the fourth ventricle. The medulla oblongata and spinal marrow are both of great magnitude in comparison with the size of the brain.—J. H.

D. *a.* 120. The cartilaginous cranium of a spiny shark (*squalus spinosus*) showing the brain and nerves, in situ. The interior of the cranium has been exposed, by the removal of sections from its superior and inferior walls : the brain with all its nerves appears in the centre of the cavity, supported at a distance from the cartilage by a singularly beautiful, reticulated membrane, the fibrillæ of which, from their numerous decussations, and attachments to every neighbouring fixed point, as well as from the manner in which they support the brain, bear a resemblance to the threads of silk forming the cocoon of the silk-worm. The interstices of these fibrillæ were filled in the fresh state, with a gelatinous, saltish, transparent fluid.—J. H.

D. *a.* 140. The brain of a cuttlefish (*sepia officinalis*). Its form and connection with the œsophagus are shown by the removal of the cartilaginous cranium in which it was enveloped.—J. H.

D. *a.* 141. The brain or cerebral organ of a cray-fish (*cancer astacus*). Four nerves take origin from this central mass—the optic, the auditory, the olfactory, and those which go to the antennæ.—J. H.

D. *a.* 142. The nervous system of a razor-fish (*solen siliqua*). Three ganglia are pointed out by bristles placed under them.

J. S.

D. *a.* 143. The œsophageal ganglion of a scallop (*pecten maximus*), together with the branches of nerves emanating from it.—J. S.

D. *b.* 191. An injected preparation of the human eye. This dissection conveys an accurate notion of the position of the eye in reference to the orbit, the lids, the muscles, &c. It shows also the several nerves, the lenticular ganglion with its ciliary branches, the lacrymal gland, and the chambers of the eye. On the opposite side of the preparation may be seen the spongy bones of the nose with their meatuses and openings, the antrum maxillare, and the sinus frontalis.—J. H.

D. *b.* 220. The anatomy of the eye of an ape (*simia maimon*), exhibited in two views. The superior one shows the interior of the eye from the side: the inferior demonstrates the ciliary processes, uvea, and cornea, from behind.—J. H.

D. *b.* 221. The eye of a monkey. (*simia sabæa*). The posterior part of the globe, showing the tunics of the eye, forms one part of the preparation: the lens with the hyaloid membrane attached, and marked by the ciliary processes and pigment constitutes the other part.—J. H.

D. *b.* 222. The anterior segment of the same eye as that in preparation 221 is here shown, demonstrating the iris and ciliary processes.—J. H.

D. *b.* 223. Two views of the eye of a monkey. In the uppermost, the anterior segment of the globe is everted, and the choroid, ciliary processes, and uvea exposed to view: in the lowermost, the globe is preserved unopened, and the sclerotic coat removed, to demonstrate the pigmentum nigrum, ligamentum ciliare, and anterior surface of the iris.—J. S.

D. *b.* 231. A latera vliew into the cavity of the eye of alioness (*felis leo*). All the coats and chambers are shown: there is a yellowish white tapetum in the bottom of the eye.—J. S.

D. *b.* 232. This preparation exhibits, in three views, the anatomy of the eye of a lion. The tunics, ciliary processes, iris, cornea, &c. are all shown.—J. H.

D. *b.* 236. The eye of a panther, (*felis pardus*) prepared so as to exhibit the lining membrane of the cornea.—J. S.

D. *b.* 237. This preparation contains four sections showing the anatomy of the eye of a wolf, (*canis lupus*)—J. H.

D. *b.* 238. All the structures of the eye of a jackall (*canis aureus*) are here shown. The preparation consists of four pieces.—J. H.

D. *b.* 241. The eye of a badger (*ursus meles*), demonstrated in four sections. The eye is remarkably small, and the lens very large in proportion.—J. H.

D. *b.* 242. The eye of a mole (*talpa Europæa*). The entire head of the animal is preserved, and stripped of its hair. On the left side, the eye is made evident by the removal of the lids : the organ is exceedingly small, and half of its bulk appears to be cornea : on the right side, the lids are preserved, showing that the opening which they form is so small as to conceal the eye, and almost prevent the light from reaching the organ.—J. H.

D. *b.* 243. The eye of a racoon (*ursus lotor*) demonstrated in three views. The size of the eye is very inconsiderable : the cornea is large and prominent, and the lens small in proportion to the general magnitude of the organ.—J. H.

D. *b.* 262. The eye of an agouti (*mus aguti*) divided into two parts by a vertical, lateral section. The cornea and lens are large : the ciliary processes are long, and approach the margin of the lens.—J. H.

D. *b.* 264. The posterior half of the eye of a spotted cavy (*cavia paca*). The sclerotic coat is thin ; there is no tapetum lucidum on the choroid. The retina has been rendered thick and opaque by the spirits.—J. H.

D. *b.* 265. The posterior half of the eye of a cavy (see 264), showing the cornea, lens, and ciliary processes in situ. The termination of the retina at the convex border of the ciliary processes is very manifest.—J. H.

D. *b.* 267. A beautiful preparation of the eye of a marmot (*marmot alpinus*). One side of the eye has been cut away, so as to give a view of all the coats, chambers, and humours. The form of the eye is nearly globular ; the cornea possesses little prominence ; and the lens is remarkably small.—J. H.

D. *b.* 269. A section of the head of a hare (*lepus timidus*). The large lacrymal gland is shown in its place at the upper part of the orbit.—J. S.

D. *b.* 286. This preparation gives a side view into the interior of the eye of a peccary (*sus tajassu*). The tapetum lucidum on the choroid coat is of a whitish colour.—J. S.

D. *b.* 300. The eye of a nylgau (*antil. pict.*) showing the sclerotic, choroid, retina, &c. The colour of the tapetum is a light blue.—J. S.

D. *b.* 301. The iris and ciliary processes of a nylgau. The pupil is in the form of a transverse slit, fringed at the superior margin, so as to form two projections.—J. S.

D. *b.* 303. The eye of an ox (*bos taurus*) showing the membranes and chambers. The tapetum has a dark blue shade.—J. S.

D. *b.* 304. The eye of an ox, exhibiting the vessels of the choroid, injected with quicksilver : they are very large and numerous.—J. H.

D. *b.* 305. The iris, pupil, and ciliary processes of the eye of an ox. The pupil is transversely oval, with regular, defined margins.—J. S.

D. *b.* 307. The anatomy of the eye of a dromedary (*camelus dromedarius*) shown in two sections. All the tunics, with the lens, ciliary processes, iris, &c. are demonstrated. The colour of the tapetum is a deep blue.—J. S.

D. *b.* 308. The vitreous humour and hyaloid membrane of the eye of a dromedary, showing the impressions made on the anterior part of them by the ciliary processes.—J. H.

D. *b.* 310. A lateral view of the eye of a dromedary (*camel. dromed.*) exhibiting all the tunics, together with the vitreous humour and lens, in situ.—J. H.

D. *b.* 311. The eye of a Llama (*camelus Glama*). This preparation gives a side view into the interior of the eye, with all the coats, chambers, and humours, preserved and exhibited in their natural places.—J. H.

D. *b.* 312. The counterpart of the eye of the Llama shown at 311, exhibiting the ciliary processes, iris, pupil, &c.—J. H.

D. *b.* 328. This preparation shows the iris and ciliary processes of the eye of a horse. The pupil is a transverse oval, with a single fringe in the centre of its upper margin.—J. S.

D. *b.* 330. A view into the back part of the cavity of a horse's eye : the colour of the tapetum is blue, with a light tint of green.—J. H.

D. *b.* 337. The eyelids of a seal (*phoca vitulina*). The opening formed by them is small : there are no eyelashes : three or four large hairs occupy the place of eyebrows : the mucous membrane lining the lids is of a blackish colour.—J. H.

D. *b.* 338. The eye of a seal, demonstrated in two sections. The superior shows the thickness of the sclerotic coat, and the entrance of the optic nerve, together with the white-coloured tapetum of the choroid. The inferior exhibits the long ciliary processes, and the reticulated muscular fibres of the iris.—J. H.

D. *b.* 343. A side-view of the interior of the eye of a porpesse (*delphinus phocæna*). By a vertical incision through the sclerotic, choroid, and retina, all these tunics have been made manifest, together with the vitreous humour and hyaloid membrane, which have been rendered opaque by the spirits.—J. H.

D. *b.* 344. The eye of a porpesse (*delph. phoc.*). The anterior part of the sclerotic, choroid, and retina have been removed : the hyaloïd membrane, hanging from the foramen centrale, suspends the lens. The approach of the retina to the circumference of the lens is evident on one side.—J. H.

D. *b.* 345. The cornea, iris, and ciliary processes of the eye of a porpesse. The cornea is transversely oval : the uvea on the posterior surface of the iris is very black : the pupil forms a transverse slit of a semilunar shape : the ciliary processes are long, and beautifully regular.—J. H.

D. *b.* 346. A section of the eye of a porpesse (*delph. phoc.*) showing the thickness of the sclerotic coat at the back part, and the fatty, fibrous texture which surrounds the entrance of the optic nerve.—J. S.

D. *b.* 347. The eyelids of a porpesse (*delph. phoc.*). They are smooth, without ciliæ, and permanently open.—J. H.

D. *b.* 348. A preparation showing the anatomy of the eye of a whale (*delphinus diodon*). The sclerotic, the choroid, the iris, the cornea, &c. are all exhibited.—J. S.

D. *b.* 349. A very perfect preparation of the eye of a whale (*balæna rostrata*). It shows that the sclerotic coat is of great thickness ; that its structure is fibrous ; and that the optic nerve, in running through it, is enveloped in a fibro-fatty texture. A portion of the side of the eye has been removed to give a view of the size of its chambers ; but in such a manner as to preserve the cornea.—*Presented by Mr. M. Daniell.*—J. S.

D. *b.* 351. A back view of the iris, cornea, and ciliary processes in the eye of a whale (*balæna rostrata*). The choroid has been detached and turned aside to show the tapetum lucidum, and the conjunctiva has been so dissected as to exhibit its continuity over the cornea. The lens, which appears at the bottom of the bottle, is small and very convex on both surfaces.—*Presented by Mr. M. Daniell.*—J. S.

D. *b.* 360. The sclerotic, and cornea of an eagle, dried and preserved in spirits of turpentine. The eye is remarkably large : it is hemispherical posteriorly, and cylindrical towards the cornea, where a ring of long plates is interposed between the layers of the sclerotic coat. The cornea, by its prominence, forms a smaller anterior hemisphere.—J. S.

D. *b.* 361. A section of the eye of an eagle. The sclerotic, posteriorly, is thin and bluish : the choroid and pecten are shown : the hyaloïd membrane and vitreous humour support the lens : the anterior angle of the pecten approaches very near the posterior surface of the lens.—J. S.

D. *b.* 362. The iris and ciliary processes of the eye of an eagle. The pupil is circular : the laminæ of the ciliary processes are long, straight, and narrow : and their extremities touch the margin of the crystalline lens.—J. S.

D. *b.* 363. The eye of an owl (*strix flammea*) demonstrated in three sections. The most remarkable peculiarity in the eye of this animal is to be seen in the length of the cylinder formed by the bony laminæ, near the junction of the sclerotic coat and cornea.—J. H.

D. *b.* 365. The eyes of a woodpecker (*picus minor*) injected. A vertical section has been made of one eye, from before backwards ; and of the other from side to side, so as to show the several coats, and chambers of the organ.—J. H.

D. *b.* 366. The skull of a young pigeon (*colomba livia*), with both eyes preserved ; prepared to show the great over-proportion which the organs of vision bear to the other parts of the head.—J. S.

D. *b.* 368. The eye of a diver. In the section here preserved a great many facts are demonstrated; viz. the entrance of the optic nerve with respect to the pecten—the prominence of the pecten through the hyaloïd membrane in the direction of the lens—together with the characters of the choroid membrane and retina. The choroid has been also dissected down, to exhibit the greenish colour of the iris.—J. S.

D. *b.* 369. Three views of the eye of a cormorand (*pelicanus carbo*) demonstrating its form and structure.—J. H.

D. *b.* 370. The eye of a gannet (*anser basanus*) prepared to show the membrana nictitans, and the beautiful muscular apparatus by which it is moved over the cornea. The preparation shows, also, the flatness of the cornea in this, an aquatic bird, as compared with the striking convexity of the same part of the organ in the eagle, shown at D. *b.* 360.—J.H.

D. *b.* 372. The eye of a purple-coot (*fulica purpurea*). The membrana nictitans, with the two muscles by which it is drawn over the cornea, are clearly shown.—J. H.

D. *b.* 373. The eye of a cockatoo (*plyctolophus sulphureus*) prepared to show the muscles of the membrana nictitans.—J. H.

D. *b.* 374. A section of the eye of a purple-coot, showing the form of the chambers—the cornea—the iris—the pecten, &c.—J. H.

D. *b.* 375. A section of the eye of a cockatoo (*plyctol. sulph.*) prepared to show the tunics and cavities.—J. H.

D. *b.* 376. A preparation showing the arrangement of the membrana nictitans and its muscle in the eye of the peregrine falcon (*falco peregrina*).—J. H.

D. *b.* 377. A section of the eye of a peregrine falcon (*falco peregr.*) showing the sclerotic coat, cornea, iris, pecten, &c.—J. H.

D. *b.* 378. The eyelids of an ostrich (*struthio camelus*). The inferior is broader and more moveable than the superior. The free margin of each is furnished with a row of straight feathers with short lateral barbs, in place of eyelashes.—J.H.

D. *b.* 379. The eye of an ostrich, preserved unopened. Independently of the view which the preparation exhibits of the general form of the organ, its muscles, and the relative proportions of its several parts, a demonstration, such as rarely offers, is given of the membrana nictitans, and the beautiful muscular provision by which the movements of the membrane over the cornea—movements so rapid as to be almost imperceptible, are accomplished. The membrane is of a semilunar shape : it is attached firmly to the sclerotic coat, by one corner and by a part of its convex border ; at the opposite corner, and all along the concave margin it is perfectly unrestrained in its movements. It is elastic, and semi-transparent, allowing a certain degree of vision through it, when drawn over the eye. It is in virtue of this membrane that the eagle can gaze on the sun. The muscles by which it is moved are two in number ; the first, the *quadratus*, is fixed by one end to the upper part of the eye, and by the other, which has no fixed attachment, it forms a cartilaginous pully near the entrance of the optic nerve, for slinging the long tendon of the second muscle, called from its shape *pyramidal*. This *musculus pyramidalis* is likewise attached to the nasal side of the globe of the eye by its fleshy extremity, and tapers at the other, into a tendon, which after making a turn about the optic nerve, passing through the pully in the quadratus, and running thence for a long distance in a groove on the sclerotic coat, ends by being inserted into the moveable corner of the membrana nictitans, after a sweep of more than half a circle, and in a direction highly favourable for exerting a sudden and extensive movement in the membrane.

The simultaneous action of the two muscles on the tendon —the pyramidalis drawing it in one direction, and the quadratus by its pully in another, at right angles with the line of the former, must exert a great force on the curved tendon, and by its means draw the membrane rapidly over the eye. The return of the membrane to its place at the inner corner of the eye is effected by its own elasticity.—J. H.

D. *b.* 392. The anatomy of the eye of a chameleon (*lacerta chameleon*) exhibited in three views. The superior shows the

small circular aperture of the eyelids ; the middle exposes to view the back part of the organ, in which the retina with a pointed eminence, like a pecten are demonstrated ; and the inferior shows the cornea, lens, &c. in their natural situations.—J. H.

D. *b.* 393. The conjunctiva of the eye of a rattlesnake (*crotalus horridus*), removed in connection with the skin. Even though separated from the organ, the membrane retains its transparent and horny nature. In this form it is thrown off annually, at the period of casting the skin.—J. H.

D. *b.* 394. The eye of a rattlesnake (*crotalus horridus*) in three pieces. The superior shows the sclerotic, choroid, and retina, in the back part of the eye : the middle exhibits the cornea and iris ; and the lower exposes to view the lens floating in the spirits at the bottom of the bottle.—J. H.

D. *b.* 395. The eye of a *boa constrictor*, demonstrated in four sections. The organ (from a large snake) is small. The upper piece is the detached conjunctiva : the part suspended below this is the anterior segment of the eye, with the lens in situ ; the portion next underneath shows the cornea and the iris without ciliary processes ; and the most inferior piece exhibits the back parts of the sclerotic, the choroid and the retina.—J. H.

D. *b.* 415. The eye of a sturgeon (*acipenser sturio*), showing the origin and position of the muscles in the orbit. There are four straight muscles which arise from the posterior part of the orbit, and two oblique, whose fixed points of attachment are at the anterior border of the cavity. The beautiful olfactory membrane, arranged in laminæ radiating towards a central fixed point, is also exhibited in the preparation.—J. H.

D. *b.* 416. This preparation shows the straight and oblique muscles of the eye of an angel shark (*squalus squatina*), in situ, supported by the cartilaginous pedicle, which extends from the apex of the orbit to the posterior part of the eye.—J. H.

D. *b.* 417. Both eyes of an angel shark, removed from the orbits, and prepared to show the muscles and pedicles which support them.—J. S.

D. *b.* 419. The anterior part of the eye of a dog-fish (*squalus caniculus*), prepared to demonstrate the abundance and delicacy of the cellular tissue by which the conjunctiva is joined to the surface of the cornea, and of the sclerotic coat. The laxity of this tissue is such as to allow of the conjunctiva being torn away from the other tunics by a very slight effort of extension.—J. H.

D. *b*. 421. A side view of the interior of the eye of a shark. The sclerotic coat is a globe of semi-pellucid cartilage, perforated posteriorly, as shown in the preparation, by a round hole for the entrance of the optic nerve. The choroid coat is lined with pigmentum nigrum, and is continuous anteriorly with the iris, on the posterior surface of which, it forms long, fine striæ resembling ciliary processes. These striæ do not, however, stand out distinct from the iris, after the manner of the ciliary processes in the eyes of mammalia; there is no space between them and the posterior surface of the iris, analogous to the posterior chamber of the eye in that class of animals.—J. H.

D. *b*. 422. A section of the eye of a sturgeon (*acipenser sturio*). The sclerotic coat is cartilaginous, and of remarkable thickness : the outer surface of the choroid is of a nacreous, silvery hue. The lens and cornea are exhibited in the preparation.—J. H.

D. *b*. 423. The eye of a dog-fish (*squalus caniculus*). The sclerotic coat is not perfectly spherical : the cornea has been removed, to show the thin, resplendent iris.—J. H.

D. *b*. 424. The eye of a shark. The fibrous tunic enveloping the cartilaginous sclerotic, and into which the muscles of the eye are inserted, is here displayed : the circular hole in the back part of the sclerotic for the entrance of the optic nerve ; the dark brown colour of the iris, &c. are also exhibited.—J. H.

D. *b*. 425. The anterior part of the eye of a shark. The sclerotic, the choroid, the iris, and the cornea are all shown : the ciliary processes are long and fine, and terminate on the back of the uvea, in striæ, which run to the very margin of the pupil.—J. H.

D. *b*. 426. An anterior segment of the eye of a ray (*raja batis*). The shape of the cornea is an oval, flattened superiorly. A leaf-like fringe, pendent from the free margin of the iris, hangs over the pupil. The choroid is continued along the back of the iris, without giving origin to any ciliary processes.—J. H.

D. *b*. 428. The vitreous humour, hyaloïd membrane, and lens of a shark. The zone formed by the impressions of the ciliary processes, on the anterior part of the vitreous humour, around the circumference of the lens, has been rendered evident by an injection of coloured size.—J. S.

D. *b*. 429. Two sections of the eye of a torpedo (*raja torpedo*) showing the cartilaginous sclerotic, the choroid, the uvea, and the lens.—J. H.

D. *b.* 430. A posterior segment of the eye of an electric ray. The iris is dissected down to show its continuity with the choroid, and the absence of any thing bearing a resemblance to ciliary processes.—J. H.

D. *b.* 431. The sclerotic coat and cornea of the eye of a shark. The preparation, consisting of these two tunics, is the only relic of the eye of a shark, macerated in water for several months.—J. H.

D. *b.* 436. The eye of a gar-pike (*esox belone*). The organ is small, and considerably flattened in the antero-posterior direction : the colour of the sclerotic is greenish, somewhat like that of the skeleton. (see E. *a.* 692.)—J. H.

D. *b.* 437. The eye of a mullet (*mugil cephalus*). The plaited arrangement of the optic nerve, and its course towards the sclerotic is shown. The cornea is flat, the iris silvery white, the pupil circular.—J. S.

D. *b.* 438. The posterior segment of the eye of a pike (*esox lucius*). The sclerotic coat is cartilaginous: the choroid consists of three laminæ—an external silvery, a middle vascular, and an internal formed of pigmentum nigrum. An oval spot, about the size of sixpence, presents itself internally at the outer side of the entrance of the optic nerve. This spot is lighter in colour than the rest of the black pigment, and may bear some analogy to the tapetum lucidum in other animals. –J. H.

D. *b.* 439. Two sections of the eye of a pike (*esox lucius*) —a posterior, showing the sclerotic, the choroid, and the retina ; and an anterior, demonstrating the yellow iris, black uvea, and absence of ciliary processes.—J. H.

D. *b.* 440. The eye of a haddock (*gadus æglifinus*), showing the choroidal gland, surrounding the entrance of the optic nerve. By injection, a multitude of large, distinct vessels have been rendered evident in its structure.—J. S.

D. *b.* 460. The eye of a cuttlefish (*sepia loligo*). The conjunctiva is shown in front, supplying the place both of cornea and eyelids : and posteriorly, a glandular substance, like the milt of fishes, is made evident.—J. H.

D. *b.* 461. The head of a cuttlefish (*sepia loligo*), prepared to show the magnitude, and position of the eye. By the removal of the integuments which supply the place of cornea, conjunctiva and eyelids, the sclerotic coat, the iris, and the lens, have been all brought into direct view. The iris is shown to be continuous with the sclerotic coat ; the pupil is circular, and the lens appears protuding through it. A few of the vessels of the sclerotic, and those at the lateral margins of the lens are injected red.—J. H.

D. *b.* 462. The conjunctival covering of the eye of a cuttlefish (*sepia officinalis*), showing the manner in which it forms a kind of anterior and posterior eye-lid, at the point where it is continuous with the skin.—J. H.

D. *b.* 463. The eye of a cuttlefish (*sepia officinalis*) separated from the body. The optic nerve forms an enormous ganglion at the back part of the eye, larger than the whole brain. The situation of this ganglion is between the two layers of which the sclerotic is composed, and of which one has been in part cut away and turned aside, for its exhibition. From the ganglion, numberless fine nerves may be seen to radiate, all running, with various degrees of obliquity, forwards, to perforate the sclerotic coat, and expand in the formation of the retina. A two-pointed valve hangs from the superior margin of the pupil, giving to that opening a kidney-shape. The glandiform structure around the optic ganglion is demonstrated.—J. H.

D. *b.* 464. The eye of a cuttlefish (*sepia loligo*) showing the delicate hyaloïd membrane inside the sclerotic coat, &c. &c.—J. H.

D. *b.* 465. An anterior segment of the eye of a cuttlefish (*sepia offic.*). From behind, may be seen the beautiful pigment of the choroid, the ciliary processes, and the posterior prominent convexity of the cristalline lens : the ciliary circle has received some red injection, attempted to be thrown into the organ. Viewing the preparation from before, the absence of cornea, the continuation of the iris with the sclerotic coat, and the kidney-shaped form of the pupil are all severally demonstrated.—J. H.

D. *b.* 466. A valuable preparation, exhibiting the eye of a cuttlefish (*sepia offic.*), in its place on the head. One side of the organ has been cut away, so as to show all the tunics, and chambers. The double layer of the sclerotic, at the back part, together with the interposed ganglion of the optic nerve, and the neighbouring glandiform body are distinctly shown. The termination of the sclerotic in the iris, anteriorly, and the contact of that membrane with the conjunctiva are also demonstrated. The lens is to be seen immediately under the integuments, without cornea, aqueous humour, or anterior chamber ; but behind the lens, a large chamber may be noticed, in which the vitreous humour is contained. The brain is shown, in its small cartilaginous bed, at the back part of the orbit.—J. H.

D. *b.* 480. The eyes of a lobster (*cancer gammarus*). They are two in number, and placed, each, on the extremity of a

movable pedicle projecting from the upper and anterior part of the head. (see D. *c.* 706). The black, polished, convex surface in front is the cornea, which, when examined with a lens, is seen to present facets like those on the eyes of insects. A section has been made of one of the eyes, and of the pedicle on which it stands : the pedicle is shown to be hollow, for giving passage to the optic nerve : the globe of the organ contains retina, choroid, and abundance of black pigment ; and is traversed by filaments, supposed to be nervous, radiating from the entrance of the optic nerve, towards the cornea.—J. H.

D. *c.* 510. The cartilages of the external ear of the human subject, dissected and preserved in spirits.—J. H.

D. *c.* 511. A preparation showing the ceruminous follicles of the meatus auditorius externus of the human ear.—J. H.

D. *c.* 512. This preparation shows the situation and course of the nerves connected with the ear ; together with the semicircular canals and cochlea. The vidian nerve may be seen arising, in the spheno-maxillary space, from the ganglion of meckel under which a slip of blue paper is placed, and thence taking its course through the pterigoïdean canal, which has been exposed by the removal of the internal pterigoïd plate. It is next shown passing across the foramen lacerum, to be applied on the anterior surface of the petrous bone, where it enters into the hiatus Fallopii ; the junction of the nerve with the portio dura, in the aqueductus Fallopii, has been also exhibited by the removal of the lamina of bone covering the aqueduct. The nerve is shown, afterwards, escaping from between the malleus and incus, and coursing along the upper border of the membrana tympani, to find an exit from the skull through the fissura Glisseri. Outside the skull, the nerve may be again seen, under the name of corda tympani, leaving the foramen in the fissure, and after a short course attaching itself to the gustatory : the subsequent separation of it from this nerve, and ts entrance into a little ganglion in the submaxillary gland—rendered evident by a bit of blue paper, are all satisfactorily demonstrated. The cochlea, and semicircular canals are dissected, and the seventh pair entering the meatus auditorius internus, are all dissected and shown.—J.H.

D. *c.* 513. In this preparation the base of the skull is preserved, with the osseous labyrinths dissected. On the right side, the semicircular canals are laid open, and the shell of the cochlea is preserved entire—on the left, the spiral cavity of the cochlea is exposed, whilst the canals are demonstrated without being cut into.—J. H.

D. *c.* 514. A glass case containing eight preparations of the human ear. One is a cast, in metal, of the cochlea, semicircular canals, tympanum, and mastoid cells. The others are views of the canals and cochlea, dissected on the dry bones ; and specimens of the ossicula in their connected and detached states, &c.—J. S.

D. *c.* 515. A preparation of the human ear dried, and preserved in turpentine, giving a comprehensive view of almost all the parts of the organ. The cartilages of the external ear are preserved, in situ—the cartilaginous part of the external meatus is rendered distinct, by a black coating, from the osseous portion of it, which retains its white color. The length and direction of the canal can, by this demonstration, be well appreciated ; and the oblique aspect of the membrana tympani may, also, be clearly seen. By looking to the opposite side of the preparation, the ossicula—the two muscles of the malleus—the semicircular canals—the cochlea—and the eustachian tube may be all observed, in the positions which they naturally bear to each other.—J. H.

D. *c.* 516. This preparation shows the membrana tympani in the moist state. It shows the vascularity of its texture—the concave form of its external surface—the ring of bone in which it is incased—and the connection of the malleus to its internal surface. The three ossicula are preserved in their natural places. The internal muscle of the malleus is marked by two reddish threads tied around it. The portio mollis is shown, entering the cochlea and distributing its filaments on the lamina spiralis : and the vidian nerve is demonstrated by a black bristle at the place where it rises up from between the malleus and incus.—J. H.

D. *c.* 517. The ossicula of the human ear. In the superior preparation, they are placed together in their natural relative positions : in the inferior, they are shown separately.—J. H.

D. *c.* 518. Shows the stapedeus muscle of the human ear, made evident by the insertion of a black bristle. The cochlea and semicircular canals are partially laid open.—J. H.

D. *c.* 519. Two dry preparations of the fœtal ear. In the upper, the membrana tympani, and ossicula are shown—and the cavities of the labyrinth cut open. In the lower, the osseous laminæ of the canals, and cochlea are exhibited without exposure of their cavities.—J. H.

D. *c.* 520. The canals and cochlea of the human ear, detached from the surrounding bone. There are two preparations : the superior is a careful dissection of osseous labyrinth, without exhibition of the cavity. In the lower one, the in-

terior of the semicircular canals has been blackened, and a section made of the cochlea, in such a manner as to expose the lamina spiralis and the scalæ. The spiral lamina has been painted black all round; the compartment above it, is the scala of the vestibule; that along the lower surface is the scala which opens by the foramen rotundum into the tympanum.—J. H.

D. *c.* 521. In this preparation of the human ear, a vertical section has been made through the centre of the vestibule, to show the shape of the cavity, and the openings into it from the semicircular canals and cochlea.—J. H.

D. *c.* 522. The head of an human fœtus about the third month of utero gestation, showing the membranous or cartilaginous condition of the semircular canals at this age. The oblique and vertical canals are laid open—the horizontal is preserved entire, so as to show very distinctly the soft, opaque membrane. The right ear, only, is dissected: it is considerably magnified by the spirits and convex glass in which it is preserved.—J. H.

D. *c.* 523. A magnified model of the canals and cochlea of the human ear—copied from the superior of the two preparations shown at D. *c.* 520. The model is made of wax, and very accurately formed.—J. H.

D. *c.* 530. The left ear of a child about twelve years of age, born deaf and dumb. All the parts of the organ, as well the external as the internal, were to appearance perfectly natural. There was no obstruction in any of the external passages—and the most careful, and minute examination could not discover any thing in the arrangement of the ossicula or their muscles—the conformation of the labyrinth—or the size and distribution of the nerves, at all differing from the ordinary condition of these parts Most of the compartments of the ear are shown in the preparation.—*Presented by Dr. Charles Orpen.*—J. H.

D. *c.* 543. This preparation shows the semicircular canals —the cochlea—and the ossicula of the ear of a monkey. There is no mastoid process; and the cavity of the tympanum is large, like that in the ears of many of the lower animals.—J. H.

D. *c.* 552. The external and internal ears of a mole (*talpa Europea*). The left ear shows the deficiency of external projecting cartilages. There is a mere hole in the integuments, surrounded by hairs. The meatus auditorius externus is of great length, and runs backwards towards the base of the skull, where it widens at its junction with the bone. The right

ear shows the prominent semicircular canals, and the horizontal position of the membrana tympani. The membrane is painted yellow, and for its better exposition the cochlea has been cut away.—J. H.

D. *c.* 553. The cartilages composing the external ear of a cat (*felis catus*) divided into three pieces.

D. *c.* 554. The internal ears of a cat. In the upper part of the preparation, the cochlea, semicircular canals, and large tympanum are displayed—and below the membrana tympani and ossicula are shown.—J. H.

D. *c.* 556. Two dissections, showing the semicircular canals of the ear of a batt, in connection with the cochlea. The cochlea of the ear is many times larger than the canals.—J.H.

D. *c.* 570. The external ear of a guinea pig (*cavia*) showing a deficiency of the helix and lobe.—J. H.

D. *c.* 571. The cochlea of the ear of a guinea pig—remarkable for forming $3\frac{1}{2}$ turns, from whence it is termed turriculated.—J. H.

D. *c* 572. The internal ear of a squirrel (*sciurus vulgaris*). The canals and cochlea are clearly shown. The canals are painted red in the upper preparation, and in the lower the cochlea is shown, opposite the black ground in the centre of the bone.—J. H.

D. *c.* 573. The internal ears of a rat. In the upper row, the malleus, incus and stapes are shown, detached from each other. In the middle row, they are placed together, with the stapes painted white—the incus yellow—and the malleus red. In the lower row, the canals and cochlea are shown; the three canals are painted red, and the spires of the cochlea yellow.—J. H.

D. *c.* 584. The internal ear of a sheep. The canals and cochlea are shown in the upper part of the preparation—in the lower part, the membrana tympani, and the ossiculi are exhibited, painted of different colors.—J. H.

D. *c.* 600. The meatus auditorius externus of a seal (*phoca vitulina*). There is a mere hole, without projecting cartilages, on the side of the head, surrounded and covered over by hairs.—J. H.

D. *c.* 601. The cartilaginous walls of the meatus auditorius externus of a seal (*phoca vitulina*). The tube is narrow, and covered with ceruminous follicles. In the recent state it was nearly closed up by cerumen.—J. H.

D. *c.* 607. The meatus auditorius externus of a porpoise. (*delphinus phocæna*). It is a narrow, nearly straight tube, the external orifice of which is so small as scarcely to be discoverable in the integuments : a bristle points it out.—J. H.

D. *c.* 621. This preparation shows the osseous labyrinth of the ear of an owl. The semicircular canals, the cochlea, ducts, and tympanum are prepared in the same manner as those in the ear of the goose, to be seen at D. *c.* 624.—J. H.

D. *c.* 622. The organ of hearing in the sparrow. The osseous semicircular canals are dissected. The vertical canal is smaller and placed more posteriorly, with respect to the other two, than in most other birds.—J. H.

D. *c.* 623. The external parts of the organ of hearing in the goose (*anas anser*). On the left side, the meatus auditorius externus is shown, without projecting cartilages and merely surrounded by feathers—on the right, the membrana tympani is exhibited, with its convexity outwards; and in the pharynx, the common orifice of the eustachian tubes is made evident by bristles.—J. H.

D. *c.* 624. The osseous structures of the ears of a goose. The osseous semicircular canals are painted red—the cochlea yellow—and the ducts leading from the tympanum black. The cone-shaped cochlea is shown in the base of the skull. Two of the canals leading from the tympanum are made evident; one is short, and placed underneath the semicircular canals—the other is long, and leads through the base of the skull towards the cella turcica, where it communicates with that of the side opposite. The eustachian tube is indicated by a black bristle.—J. H.

D. *c.* 625. The ossiculum of the ear of a goose. In the recent state there are two pieces, which form an angle at the point of their attachment with each other. One of these pieces, being cartilaginous, and attached to the surface of the membrana tympani, has been lost during the maceration of the bone.—J. H.

D. *c.* 638. The organs of hearing in a frog (*rana temporaria*). On the right side may be seen the membrana tympani, on the same level with the skin, and differing from it only in color. Here also is shown the internal ossiculum (in frogs there being two) applied to the foramen ovale. The semicircular canals are three in number, and arranged as in the skate (D. *c.* 664). The membrana tympani of the left ear has been removed to exhibit the cartilaginous end of the external ossiculum, which is attached to its inner surface. The yellow crustaceous matter of the vestibule may be seen in the centre between the canals.—J. H.

D. *c.* 639. The ears of a toad (*rana bufo*). They resemble those of the frog (638). The custachian tube, a simple hole, may be observed in the lateral and back part of the mouth, near the articulation of the lower jaw.—J. H.

D. *c.* 640. The ear of a serpent (*coluber natrix*). It is very small, and must be looked for attentively to be discovered. A black bristle, placed transversely above the organ, points to its situation. The semicircular canals of the right ear are dissected : they form by their arrangement an equilateral triangle, and contain within them membranous ampullæ, The organ possesses but one ossiculum, which may be seen, in situ, by looking a little to the outer side of the canals. One end of it fills up the opening of the vestibule, and the other is placed among the muscles about the inferior maxilla.—J. H.

D. *c.* 663. The ear of a skate (*raja batis*). In this preparation the membranous semicircular canals are shown (right ear), loosely supported in their cartilaginous beds : they are three in number, anterior, posterior, and horizontal, and all open into a common vestibule. The nerves after having perforated the common septum, interposed between the ear and the brain, ramify on the vestibule and ampullæ of the semicircular canals The meatus auditorius externus leads off from one corner of the vestibule ; it traverses the cartilaginous cranium by a winding canal, and communicates with the surface at the back of the head by a very minute orifice : the tube and orifice are indicated by a black bristle. The lapilli of the vestibule, and membranous canals are of a cretaceous consistence, and not hard as in osseous fish.—J. H.

D *c.* 664. The ear of a skate (*raja batis*) The cartilaginous canals are laid open, and the membranous canals contained within them are filled with red injection. The nerves of the ampullæ ; and the meatus auditorius externus are also shown.—J. H.

D. *c.* 665. Both ears of a ray, to show their relative position, and the chalky substance which occupies the semicircular canals and vestibule.—J. H.

D. *c.* 666. The ear of a shark (*squal. galeus*). The arrangement of the canals is the same as in the skate (663). The ampullæ of the organ are stronger, and more opaque than those of that fish.—J. H.

D. *c.* 667. The ears of a dog-fish. Slips of blue paper are placed under the membranous canals ; and the external ears are pointed out by bristles.—J. H.

D. *c.* 668. The ears of a sturgeon (*acipenser sturio*). The brain and ears are both preserved. The membranous canals of the ear are painted red.—J. H.

D. *c.* 670. The ears of an angel shark (*squalus squatina*).

the distribution of the auditory nerve on the vestibule is singularly beautiful.—J. H.

D. *c.* 671. The ear of a hollybut (*pleuronectes hippoglossus*), showing the cartilaginous and membranous labyrinth, with its nerves in situ.—J. H.

D. *c.* 672. The ear of a hollybut (*pleuron. hippogl.*). The membranous semicircular canals, together with the vestibule, and its lapilli are removed from their situation, and suspended in spirits.—J. H.

D. *c.* 683. The ear of a cod fish (*gadus morrhua*). The preparation shows the osseous, and membranous semicircular canals : two are vertical, and one horizontal. The vestibule, into which the canals open, contain three lapilli (686)—J. H.

D. *c.* 684. The membranous, detached from the bony canals of the ear of a cod fish. They are suspended in the position which they naturally hold.—J. H.

D. *c.* 685. This preparation shows the distribution of the portio mollis on the ampullæ of the canals and vestibule in the left ear of a cod fish.—J. H.

D. *c.* 686. The three ossicula of the cod's ear (*gad. morrh.*), preserved as a dry preparation.—J. H.

D. *c.* 687. The ear of a pike (*esox lucius*). The membranous canals are of great length ; and there is a little cavity communicating by a narrow neck with the back part of the vestibule, and fixed by a blind extremity to the edge of the foramen magnum, not met with in any other fish.—J. H.

D. *c.* 688. The membranous ampullæ of a hake's ear, removed from the osseous canals. The vestibule is preserved uninjured, and retaining its ossicula : the large ossiculum is of unusual shape, and size.—J. H.

D. *c.* 702. The organs of hearing in the cuttlefish (*sepia loligo*). An oblique section has been made through the head, so as to lay open the two little cavities which constitute the ears, and which are enveloped in the cartilaginous cranium : they may be seen immediately over a bristle, inserted transversely beneath them : each sac is of an oval shape.—J. H.

D. *c.* 706. The ears of a lobster (*cancer gammarus*, L.) They consist, each, of a simple sac, enclosed in a scaly cylinder, situated at the base of the tentaculum magnum. A black bristle has been passed through the axis of one ear, and the cavity of the other has been laid open. The outer end of each cylinder is closed by the membrana tympani—the inner gives passage to the auditory nerve. The organ is of the most simple construction.—J. H.

D. *d.* 713. An injected preparation showing the cavities of the nose and mouth, at about the twelfth year; a vertical section, from ear to ear, has divided the meatuses of the nose, and the cavity of the mouth nearly in the middle, and has severed the anterior from the middle lobe of the brain, leaving the former in connection with the frontal bone.—J. H.

D. *d.* 714. The counterpart of preparation D. *d.* 713. The posterior part of each orbit, the meatuses of the nose, and the arches of the mouth are well exhibited. The openings from the antra maxillaria, into the upper part of the middle meatuses, are traced and shown. The temporal, pterygoïd, and palatine muscles are displayed by the dissection.—J. H.

D. *d.* 715. A vertical section has been made through the forehead and nose on either side of the septum nasi, to demonstrate the structure and the extent of the septum—the frontal and sphenoidal sinuses—and the central portions of the soft palate and uvula.—J. H.

D. *d.* 717. A beautifully injected preparation of the human nose, viewed from the side : the meatuses are all shown, together with the passages into them from the frontal, sphenoidal, and ethmoidal sinuses. The opening of the antrum, and that of the nasal duct are likewise demonstrated. A part of the same head as that at 715.

D. *d.* 738. A horizontal section through the nose of a fœtal calf. The spongy bones are shown to be, at this period, in the state of cartilage.—J. H.

D. *d.* 751. The external nose—or blow-hole of a porpoise (*delph. phoc.*). It is in the form of a transverse slit at the top of the head, communicating with the upper part of the pharynx. The passage leading to it is convoluted and valvular.—J. H.

D. *d.* 774. The olfactory organ of a sturgeon (*acip. sturio.*). It consists of a beautifully plaited membrane, on which the olfactory nerve is distributed. A bony bridge is thrown across it, as a protection, but so placed as to allow of easy access of the water to the organ.—J. H.

D. *d.* 782. The nose of a hollybut (*pleuronectes hippoglossus*). Two black bristles point out openings which lead from the plaited olfactory membranes into pouches placed underneath them. There were two openings from the surface into the nose —one on a level with the skin, the other in the extremity of a moveable piece of cartilage.—J. H.

D. *e.* 831. A piece of integument from the arm of a man. The arteries have been injected red, the veins yellow—and not only is the extensive anastomosis of the vessels with each

other shown, but the actual communication between the arteries and veins in some parts is demonstrated.—J. S.

D. *e.* 837. Part of the integuments removed from below the breast of a woman who died in the year twelve hundred and eighteen—and whose remains were preserved in the catacombs near Bourdeaux.—J. H.

D. *e.* 838. A piece of human skin tanned. It was taken from a man named Magrath, whose skeleton is in the Anatomical Theatre of Trinity College. It was long in the possession of Dr. Hill, Reg. Prof. T. C. D., and presented to the College of Surgeons, by his son the Rev. Wm. Hill.—J. H.

D. *e.* 866. Skin of a hedgehog (*erinac. Europ.*), showing its structure, and the muscles which attach it to the trunk for the purposes of motion.—J. H.

D. *e.* 867. The lip and beard of a spotted cavy (*cavia paca*), showing the mode of growth of the hair.—J. H.

D. *e.* 893. A piece of cuticle from the sole of the foot of a Llama. It is very thick, and hard, and covered on its deep surface with depressions for the reception of the villi of the icutis.—J. H.

D. *e.* 892. A piece of cutis from the sole of the foot of a Llama (*camelus glama*). The cuticular surface is covered with long, fine villi, which pass into foramina in the cuticle; the deep surface is in close connection with a mass of elastic cellular substance analagous to that in the foot of the camel. See E. *b.* 856.—J. H.

D. *e.* 900. The beard of a seal (*phoca vitulina*), to demonstrate the mode of growth of hair; the bulb of a large hair, extending a long way under the skin, and the roots of several others cut transversely across are exhibited to explain their extent and structure.—J. H.

D. *e.* 905. Part of the integuments of a whale (*balæna rostrata*). The cuticle and rete mucosum are turned off in separate strata, and the villi of the cutis exposed. The subcutaneous cellular tissue, containing the fat or blubber, is of considerable thickness.—J. S.

D. *e.* 919. A specimen of cutis from the sole of the foot of an ostrich (*struthio camelus*), detached from the hard cuticle which is shown in preparation 920. The surface of the cutis exhibits villi, developed in so remarkable a degree as to equal the papillæ on the tongues of many of the larger mammalia.—J. H.

D. *e.* 934. The rattle of the tail of a rattlesnake (*crotalus horridus*). A section has been made longitudinally through the

three first pieces, to show their shape, and the manner by which they are mechanically bound together.—J. H.

D. *e.* 935. The caudal vertebræ of the rattlesnake (*crot. horrid.*), to show the mode of attachment of the rattle. The last bone is of the same shape as the first joint of the rattle, which grows on it, and fits to it accurately : numerous red muscles are inserted into it, for shaking and thereby sounding this very singular apparatus.—J. H.

E. *b.* 776. A preparation showing the juxta-position of the bones and ligaments constituting the knee joint. A vertical section has been made from before backwards with a saw. The situation of the patella in the extended posture of the leg, the thickness of the inter-articular cartilages, and the application of the fat behind the ligamentum patellæ, in filling up the hollows between the bones, may be well understood from looking at this preparation.—J. H.

E. *b.* 854. A part of the hinder leg of a fœtal calf, about the third or fourth month. Sections have been made through the bones forming the joints of the tarsus and phalanges to show the degree of advancement of ossification. The os calcis is in part ossified : the astragulus and cunieform bones are in a cartilaginous state, but indications of the commencement of ossification in them are given by the presence of several blood-vessels, some of which are so large as to have received colored injection. The epiphyses are all without bone, but the formation of red vessels in them shows that a deposit of that material was about to be made at the period when the animal ceased to live.—J. H.

E. *b.* 855. One of the toes of a lion, showing the elastic ligament by which the last phalanx supporting the nail is held back on the dorsum of the foot, at times when the action of the claw is not required by the animal. The flexor tendon, by which the ligament is counteracted, and the nail brought from its place of concealment, is also shown.—J. H.

E. *b.* 856. The elastic mass which gives spring to the sole of the foot of the dromedary. This singular structure is interposed between the dense skin of the sole of the foot and the bones ; it consists of the most delicately formed cellular tissue, the fibrillæ of which are closely interwoven with each

other, and free from any admixture of serum or adeps. By pressure it may be made to assume any form, though its bulk undergoes no change. A structure of the same nature exists in the sole of the foot of the Llama. See D. *e.* 892.—J. H.

E. *b.* 856. A portion of elastic or yellow ligament from the abdominal parietes of a dromedary (*camel. dromed.*). A broad sheet of this structure covers a considerable extent of the sides and lower part of the abdomen of the animal, but is of greatest density towards the pubes. It lies between the skin and muscles, and appears to be a modification of the sub-cutaneous cellular tissue.—J. H.

E. *b.* 860. A piece of tendon taken from among the muscles of the back of a whale : it consists of parallel fibres arranged into numerous, narrow aponeuroses, bound together by transverse fibrillæ. These aponeurotic bands, when slit asunder and dried, become strong and flexible like twine, and as such are made use of by the inhabitants of Greenland, for a variety of purposes.—J. S.

E. *b.* 866. A dissection of the muscles of a bat (*vespert. murina*) to show the great developement of those connected with the anterior extremities, over any others in the body. The small size of the eye, and the great width of the external auditory canal are demonstrated in the preparation.—J.H.

E. *b.* 970. The os humeri of a bird, showing the air cavity in its centre, and the orifice by which this cavity receives air from the lungs.—J. S.

E. *b.* 1015. A lizzard (*gecko levis*), to show the suckers on the under surface of the toes by which the animal is enabled to run up the smooth surfaces of walls, or across the ceilings of rooms, in pursuit of flies and other insects which constitute its food. The apparatus—a soft, hollow cup, with circular brim—acts as the principle of an exhausted receiver, or like a piece of leather with a string in its centre applied in a moistened state to the surface of a stone ; and as attempts to pull off the leather, by acting on the string, only cause it to adhere more firmly, so will the suckers of the toes preserve the animal from falling by its own gravity, when moving with its body the most dependent part. By a particular exertion of muscles, it can, however, detach and re-apply its feet in succession, so as to move along with rapidity and safety. J. H.

E. *b.* 1074. A section of a portion of the spine of a frog-fish (*loph. piscatorius*) to show the cavities formed between the bodies of the vertebræ. –J. H.

E. *b.* 1075. A section of the spine of a frog-fish, showing

the elastic gelatinous substance contained in the cavities formed by the apposition of the vertebræ, and on which depend the rapid and easy motions of the body.—J. H.

E. *b.* 1076. A preparation showing the beautiful mechanism by which the pectoral fins of the hollybut (*pleuron. hippogl.*) are joined to the scapulæ: an elastic bag is interposed between the radii of the fin and the scapula, to both of which it is bound by a fibrous capsule.—J. H.

E. *b.* 1077. A piece of the abdominal muscles of a frog-fish (*loph. piscator.*) showing the shortness of the muscular fibres, and the number of the tendinous bands by which they are intersected.—J. H.

E. *b.* 1078. The sucker of a lump-fish (*cyclopterus lumpus*). The apparatus is in the form of a flat, oval disk, placed under the thorax. By it, the animal is said to be able to attach itself so firmly to rocks, that any attempts to pull it away would break off the body of the animal rather than loosen the hold of the sucker. Fishermen speak of the suckers and heads of lump-fish being found adhering to the rocks, from which the bodies have been torn away and devoured by sharks.—J. H.

E. *b.* 1079. The sucker of a sucker-fish (*echeneis remora*). The apparatus in this fish is placed at the top of the head; it is of an oval form, and about one third the length of the whole animal. It is surrounded by a broad, loose, moveable rim capable of applying itself closely to the surface on which it is placed. Within this rim are two rows of cartilaginous plates or laminæ, having each a free edge, which is finely serrated: these plates are capable of being raised up or depressed so as to bring them flat, at the will of the animal, there being peculiar muscles on the skull adapted for that purpose: these two rows of plates are separated merely by a thin partition of cartilage, and are thus divided, most probably, in order that being shorter, each may gain an increased degree of firmness, so as to be capable of bearing a more intense degree of muscular force.

By means of these plates there is a vacuum formed (viz. a space void of air as in a cupping glass) in the following manner. The external rim being closely applied to any surface, the cartilaginous plates lying flat are forcibly raised up, consequently producing interstices which become so many *vacua;* while the serrated edges of the plates, the elevation being once affected, retain a sufficient hold of the substance in contact to continue in that position, aided by the pressure of the surrounding water, without any continuance of muscular ex-

ertion. Nothing can be more simple than this apparatus, nothing more precise and adequate in its operation.

The loco-motive powers of this fish being inconsiderable, it avails itself of the powers of other fishes in order to pass through the water. The shark particularly may be mentioned, to whose sides it attaches itself, and is thereby transported with ease and safety. The sucker fish also frequently fixes itself to the bottoms of ships; and it was formerly believed to be able to arrest the course of a vessel going with stream and wind. See "*The Weekly Visitor.*"—J. H.

E. *b.* 1130. Elastic horny lamina from the back of a cuttle-fish (*sepia loligo*). It extends the whole length of the body, and lies in a smooth sheath under the integuments of the back, to which it appears to have little or no adhesion during life.—J. H.

E. *b.* 1131. Bone from the back of the cuttle-fish (*sepia officinalis*). This differs widely from that of the *sepia loligo* shown in 1130. It is composed of accurately arranged laminæ, and consists of a chalky matter, which, when finely powdered, is applied to useful purposes.—J. H.

E. *b.* 1133. One of the tentacula of a cuttle-fish (*sepia loligo*) put up to show the mechanism of the suckers by which the animal can fasten itself to surrounding objects.—J. H.

E. *b.* 1134. The new shell of a crab, formed in place of the old one, which had been recently cast off. The back shell and limbs are so soft and pliable as to admit of being bent in any direction: one of the claws has been twisted into a noose, to show its flexibility.—J. H.

E. *b.* 1135. A piece of the claw of a cray-fish (*cancer astacus*) to show the construction and arrangement of the articulations. Each joint is formed by the opposition of two points of the shell, so as to constitute a simple hinge; and they are all so placed as to take a spiral direction from one end of the limb to the other, no two in succession being directly opposite.—J. H.

F. *a.* 9. Malformation of the human urinary bladder and penis. The pubes, and the abdominal muscles in the neighbourhood are defective, and at this spot the mucous membrane of the bladder appears, exhibiting the orifices of the ureters

(as pointed out by bristles) from which the urine was discharged on the surface of the abdomen during the life-time of the individual. The penis is divided along its dorsum, by a groove marking the line between the crura.—J. S.

F. *a.* 10. Cast of a malformation of the human urinary bladder and penis from an adult. The description of that marked F. *a.* 9, is applicable to this case. The former was presented by the late Professor Todd, the latter by Professor Colles.—J. S.

F. *a.* 11. Plaster cast of a malformation of the bladder and penis, similar to the former.—J. H.

F. *a.* 12. Human urinary bladder, preserved to show the separate openings of a double ureter which arose from the right kidney. White bristles indicate them.—J. H.

F. *a.* 73. A section of the kidney of a seal (*phoca vitulina*). It exhibits numerous papillæ and lobules, with one ureter: large veins ramify on the surface, forming by their anastomoses lozenge-shaped spaces, which correspond to the intervals of the lobules.—J. H.

F. *a.* 74. A section of the kidney of a seal. The veins on the surface are injected, to show their enormous size, together with the free anastomoses which they form with each other. See B. *c.* 357.—J. H.

F. *a.* 77. A part of the kidney of a whale (*balæna rostrata*). It is divided into numerous lobules, connected by loose cellular tissue: the renal artery is injected white.—J. S.

F. *a.* 78. The kidney of a porpoise (*delphinus phocæna*). It is multi-lobular like that of the whale: the renal artery is filled with red, the vein with yellow injection: the vessels enter the anterior extremity of the gland—the ureter (filled with black wax) emerges from its posterior extremity.—J. S.

F. *a.* 90. The urinary organs of a bird. The kidneys are smooth, dark colored masses occupying the depressions between the rib-like processes of the sacral vertebræ. The ureters, which arise by separate radicles from the individual lobules, are muscular, and enter the cloaca at the sides of the rectum. There is no urinary bladder.—J. H.

F. *a.* 81. The kidneys of a bird, detached from the surrounding parts. Their lobules are connected together by cellular tissue, and the abdominal surface is covered over with peritoneum.—J. S.

F. *a.* 83. This preparation shows the relative connection between the urinary, genital, and digestive organs of the domestic fowl.—J. H.

F. *a.* 88. The kidneys of a tortoise: both kidneys are preserved: they are short, and larger behind than before.—J. S.

F. *a.* 89. One of the kidneys of a turtle (*testudo mydas*). The gland bears more analogy to that in birds and fishes, than that in mammalia, by the impossibility of distinguishing two distinct substances, and by the want of calices or pelvis. It is oblong, and divided into numerous lobules resembling convolutions, which are smooth and flattened on one surface, and meet as at a centre on the opposite. In this preparation the lobules are unravelled. In preparation F. *a.* 90, they are exhibited in their natural connected state, covered by peritoneum.—J. H.

F. *a.* 91. The kidneys of an alligator (*lacerta alligator*). The surface presents a convoluted appearance from the disposition of the lobules: the numerous radicles of the ureters are made evident by bristles; and the termination of these tubes in the cloaca is demonstrated. The cloaca is distinguished from the rectum by its more delicate structure, and by the presence of a valve at the point of its junction with that tube.—J. S.

F. *a.* 94. One of the kidneys of a rattlesnake (*crotal. horrid.*). It is long and narrow and divided into a great number of separate lobes arranged like links of a chain, one before the other: the right kidney was much longer than the left. There was no urinary bladder.—J. H.

F. *a.* 95. A kidney of a boa constrictor. It is long and narrow, and consists of many distinct lobules arranged together like convolutions of the brain. In this preparation the kidney is stripped of its fibrous capsule, and the lobules unravelled. In preparation F. *a.* 96, the organ is preserved with its capsule in connection with its surfaces.—J. H.

F. *a.* 106. The kidneys, cloaca, &c. of a ray (*raja batis*). The kidneys are so united as to constitute, apparently, a single mass: their structure is homogenous like that of the spleen, and not subdivided into lobules as in birds and reptiles: there are two ureters which arise from the renal gland after the manner of the biliary ducts from the liver, and which after a short course open into the cloaca without the intervention of a bladder. The course, size, and termination of the tortuous vas deferens, while lying on the surface of the kidney, are shown.—J. H.

F. *a.* 107. The urinary organs of a frog-fish (*lophius piscatorius*). The two kidneys are perfectly separate, and distinct; and their ureters lead to a well-formed urinary bladder. There is no supra-renal capsule.—J. H.

F. *b.* 122. A side view of the interior of the bladder, urethra, rectum, &c. in an adult man. The organs were all distended with spirits previously to their being cut open; and are exhibited in their natural relative position to each other, and to the bones and integuments of the pelvis. The right half of all the parts, including the skin of the back of the sacrum, that of the perineum, scrotum, penis, and lower part of abdomen, together with the symphysis pubis, and mesian line of the sacrum and coxyx, are satisfactorily exhibited. The plate of the male pelvis in the work entitled "Houston's Views of the Pelvis, exhibiting the natural size, form, and relations of the bladder, urethra, rectum, uterus, &c." was taken from this preparation.—J. H.

F. *b.* 123. A preparation of the organs in the pelvis of a male child, about two years of age, made in the same manner and exhibiting the same points as that marked F. *b.* 122. with the peculiarities dependent on age.—J. H.

F. *b.* 124. This preparation shows the muscles of the perineum of a man. It shows also the interior of the bladder, the prostrate gland, the vesiculæ seminales, and the vasa deferentia of the same individual.—J. H.

F. *b.* 132. The testes and gubernacula of a six-month human fœtus. The testes and gubernacula lay in the abdomen: the penis, scrotum, and bladder are preserved.—J.H.

F. *b.* 148. The penis, bladder, vesiculæ seminales, &c. of a monkey (*simia viridis*). The musculi compressores venæ dorsalis penis are demonstrated: they form a digastric muscle, the tendon of which is placed transversely on the dorsal vein, where it lies as a single trunk under the arch of the pubes. (See Dublin Hospital Reports, Vol. 5.)—J. H.

F. *b.* 149. The penis, bladder, &c. of a Satyr: the testicles and vesiculæ seminales are large; the prostate gland is divided transversely into two parts.—J. S.

F. *b.* 151. Two dried urinary bladders from female monkeys of the same species—one young, the other old: the shape of that taken from the former is pyramidal; that of the latter flattened and triangular.—J. S.

F. *b.* 162. The penis and urinary bladder of a panther (*felis pardus*). The penis is very short; the papillæ on the glans are much developed; the membranous part of the urethra is long and muscular; the urethra lies in a groove of the prostrate; Cowper's glands are large; there are no vesiculæ seminales.—J. S.

F. *b.* 163. The prostate gland of a dog. It is large, surrounds the urethra, and is divided into three lobes: its

numerous ducts, opening into the urethra, are indicated by black bristles: two white bristles point out the orifices of the vasa deferentia.—J. S.

F. *b.* 166. The penis and bladder of a cat (*felis catus*). The penis is exceedingly short and small, like that of the panther: its centre is occupied by a bone, and the glans covered with prickly, retroverted papillæ. The bladder is small and muscular.—J. S.

F. *b.* 180. The prostate gland, &c. of an opossum (*didelphis virgineana*). The ureters and vasa deferentia are shown detached: the neck of the bladder is surrounded with a small orange coloured gland; and the remainder of the urethra, to the point of its attachment at the pubis, is enveloped in a large pyramidal glandular mass at the apex of which are four glands analogous in situation to the glands of Cowper in the human subject.—J. S.

F. *b.* 181. The testicle of an opossum (*didelph. virg.*). The bulb, and glans are bifurcated: the sharp extremities of the glans are turned from each other, and each extremity is furnished on its inner side with a seminal orifice: the opening of the urethra is in the angle of bifurcation.—J. S.

F. *b.* 183. The penis and bladder of a porcupine (*histrix cristata*). The vesiculæ seminales and accessoriæ are very large, and open by separate mouths into the caput gallinaginis.—J. S.

F. *b.* 184. The penis and bladder of a hare (*lepus timidus*). Each vesicula seminalis forms a single bag, equaling in size the urinary bladder: the penis is very long and curled up at the free extremity.—J. S.

F. *b.* 185. The penis, bladder, &c. of a squirrel (*sciurus vulgaris*). The vasa deferentia run along the outer side of the vesiculæ seminales: by some physiologists the latter are looked upon as a modification of prostate gland.—J. S.

F. *b.* 186. The testes of a spotted cavy (*cavia paca*). The tunica vaginalis is preserved on one of the organs, to show the muscular stratum by which it is enveloped.—J. H.

F. *b.* 188. The male genital organs of a rat (*mus rattus*). The testes, of considerable size, are shown at the upper part of the preparation: the vesiculæ seminales are spread out along the sides of a small urinary bladder; and the vesiculæ accessoriæ or prostate gland are arranged underneath: Cowper's glands, and those in connection with the prepuce are exposed to view.—J. H.

F. *b.* 189. The male genital organs of the hedgehog (*erinaceus Europeus*). The vesiculæ seminales are of extraor-

dinary size, and consist of from eight to ten bundles, attached to the sides of the pelvis by a loose fold of peritoneum: the vesiculæ accessoriæ are also very large, and consist of four lobes.—J. S.

F. *b.* 195. The vesiculæ seminales and vasa deferentia of a stallion. The vesiculæ are large, thin, pyriform bags at the base of the bladder: the vasa deferentia increase much in size as they approach their termination, and also acquire a thick, glandular appearance: they then suddenly become much contracted, and discharge themselves into the canal of the urethra by openings, distinct from those of the vesiculæ seminales.—J. S.

F. *b.* 196. A piece of the penis of a horse prepared to show the existence of longitudinal muscular fibres in the structure of the urethra.—J. S.

F. *b.* 200. The testis and tunica vaginalis of a fœtal calf, at the third or fourth month. The animal, together with the uterus in which it existed, was dropsical, and the tunica vaginalis greatly filled and dilated. The communication between this bag and that of the peritoneum is open; the testis lies at its posterior part, bound in its place by a strong, thick gubernaculum.—J. H.

F. *b.* 207. The penis and bladder of a seal (*phoca vitulina*). The great dorsal vessels and nerves are shown, together with the musculi compressores venæ dorsalis, which are long and thick, and meet in a tendon over the dorsal vein at the spot where that vessel runs under the arch of the pubes.—J. H.

F. *b.* 208. A section of the glans penis of a seal. In the section thus prepared, the great size and number of the veins are well exhibited. They constitute the principal bulk of this part of the organ.—J. H.

F. *b.* 211. One of the testes of a whale (*delphinus diodon*). In an attempt to inject the organ with quicksilver the epididymis and vas deferens received the fluid readily, but none could be made to enter the tubuli testis, the organization of which has much of a cellular character.—J. S.

F. *b.* 212. The prepuce of a whale, stuffed and dried. It is eight feet long, and in a good state of preservation. *Presented by the late Mr. M. Daniell.*—J. S.

F. *b.* 213. The prepuce of a porpoise (*delphinus phocœna*) preserved in spirits. The interior of the prepuce, which is remarkably long, is everted.—J. H.

F. *b.* 224. 225. 226. These three preparations demonstrate the singular changes in development which the testes of birds undergo at the approach of the breeding season. In the

first, taken from a sparrow in the month of December, the testes are barely visible: in the second, that of another killed in January, they have acquired a considerable increase of bulk; and in the last, a February-bird, the organs have grown to the size of large peas.—J. S.

F. *b.* 228. An important preparation giving a connected view of the organs belonging to the pelvis of a male ostrich (*struthio camelus*), viz. the penis with its dorsal groove, and muscles for propulsion and retraction; the cloaca for holding the penis in its retracted state; and a large musculo-membranous bag into which the rectum, and ducts from the kidneys and testicles open, termed by anatomists the urinary bladder.—J. H.

F. *b.* 229. A testicle of an ostrich. The organ is large, and divided into two distinct portions—a body and epididymis. The vas deferens runs in a straight line, without convolutions: it lies for a considerable way in front of the kidney; and opens near the orifice of that tube into the vesica urinaria, under the slit-like opening which serves as a neck to the bladder, and marks the commencement of the groove on the dorsum of the penis.—J. H.

F. *b.* 240. The penis of a tortoise injected. It is large and furnished with a glans anteriorly: the urethra is in the form of an open groove, situated on the dorsum.—J. S.

F. *b.* 241. The penis, urinary bladder, and testes of a tortoise, uninjected. The urethra, in the flaccid state, is only an open groove, which by erection of the organ is converted into a closed canal. There is an oblong testis on each side, with a convoluted seminal duct, which opens into the cloaca at the back of the penis.—J. S.

F. *b.* 242. The penis, vasa deferentia, cloaca, ureters, and urinary bladder of a turtle (*testudo mydas*). The cloaca, in which the organ is concealed, has been turned inside out: the small, pointed penis appears on one side, and the orifices of the ureters, marked by the introduction of black bristles, present themselves on the opposite.—J. H.

F. *b.* 247. One of the penises of a rattlesnake (*crotalus horridus*). There are two penises, in this class of reptiles, which lie in a fibrous sheath under the caudal vertebræ, and are enveloped by a circular muscle: each is bifid anteriorly, and pointed behind, where the end is fixed to the bones: the bifurcated extremity opens into the cloaca. An oblong gland, holding a fœtid fluid, lies on the lower surface of each.—J. H.

F. *b.* 248. One of the penises of a rattlesnake. Its bifid

extremities are cut open to show the fringed, villous appearance of the inner surface.—J. H.

F. *b.* 249. A testicle and the corresponding kidney of a rattlesnake (*crot. horrid.*). The testicle is narrow, and about two inches in length: the vas deferens arises from its anterior extremity, and then turns back along its side; after running some way under the peritoneum, it is applied on the kidney which conducts it to the penis. The right testis is that preserved; the left was smaller, and situated at a greater distance from the kidney.—J. H.

F. *b.* 260. The kidneys and vasa deferentia of a skate (*raja batis*). The kidneys very much resemble those in birds: the vasa deferentia are much convoluted, and enlarge considerably as they approach their termination: they lie on the surface of the kidneys, and open into the cloaca, which is exhibited in the lower part of the preparation.—J. H.

F. *b.* 262. The genital organs of a male angel shark (*squalus squatina*). At the top of the bottle, two lobulated bodies, the glandular parts of the testes, appear; and next underneath them are the epididymi: the seminal ducts are small at their commencement, but gradually enlarge as they run along the surface of the kidney to the penis which lies in the cloaca: the interior of the vas deferens is occupied by innumerable fine transverse laminæ, almost filling up the cavity. The entrances of the vasa deferentia into the penis are pointed out by two pieces of whalebone.—J. H.

F. *c.* 290. A preparation in spirits, showing the organs contained in the pelvis of a woman about forty years of age, and who had borne children. One half of the pelvis, and one half of each viscus has been cut away, after distention and immersion in alcohol, exhibiting the form of the cavities and their anatomical relations, during the state of plenitude.—J.H.

F. *c.* 291. A preparation of the viscera in the pelvis of a woman who had never been pregnant. It has been prepared by the same process, and exhibits the same objects as that marked F. *c.* 290.—J. H.

F. *c.* 292. A preparation made in the same manner as the two preceding, demonstrating the relative anatomy of the pelvic viscera in a girl about twelve years of age. The valvular disposition of the mucous membrane of the rectum is very strikingly shown in the preparation. In this case there are four well marked valvular folds at different points in the interior of the gut. The preparation is delineated in the Dublin Hospital Reports, vol. 5.—J. H.

F. *c.* 293. The generative organs of a virgin. The hymen

is perfect : the rugæ pennatæ, in the internal and posterior surface of the uterus, are well marked ; and there is an appearance of a corpus luteum in one of the ovaria. The preparation has been successfully injected with size, coloured with vermillion.—J. S.

F. *c.* 294. The uterus, ovaria, fallopian tubes, and external organs of a virgin, injected with coloured size, and beautifully exhibited.—J. S.

F. *c.* 300. Human uterus at a very early period of impregnation : the uterus appears larger than usual at so early a stage : the decidua vera is remarkably thick, and has received some of the injection thrown into the uterine arteries : the decidua reflexa is shown distinctly, enclosing the membranes of the ovum : the spongy chorion is thick and flocculent though not larger than a bee : a membrane is discernible within the chorion, but no fœtus can be detected. Doubts have been entertained as to this case being an instance of impregnation unconnected with disease, on account of the great size of the uterus and thickness of the decidua.—J. S.

F. *c.* 302. Human uterus, about the third month of impregnation, minutely injected. The injection was introduced from the uterine vessels, and has entered into those of the decidua : the spongy chorion is injected yellow. Portions have been removed from the front of the uterus, decidua, and chorion, bringing into view the amnion enveloping the fœtus which floats in the liquor amnii with its head uppermost. In a section of the right ovarium, a vesicle is exposed. The individual from whom this preparation was taken died of a rapid fever.—J. S.

F. *c.* 304. Human uterus containing a fœtus at about the fourth month, injected. Its form is somewhat triangular. The membranes are all exposed in a most satisfactory manner ; and the position of the fœtus is demonstrated : its head lies at the orifice of the womb, its back at the fundus, its shoulders against one cornu, and its buttocks against the other. A corpus luteum exhibiting two distinct structures, one vascular, the other yellow, exists in the right ovarium. The individual died of consumption. Some symptoms of commencing labour had shown themselves before her death ; but no dilatation of the os uteri had taken place.—J. S.

F. *c.* 306. The uterus of a woman at the sixth month of pregnancy. The preparation is very complete. Sections have been removed from the anterior walls of the uterus, decidua, chorion and amnion, so as to demonstrate their structure and relative bearings, and to exhibit the fœtus in the

attitude which it occupied during life: the chord is also shown, arising from the placenta at the posterior wall of the uterus, and making turns around the legs and neck of the child. The mother died of pneumonia.—J. H.

F. *c.* 308. The uterus of a woman at the ninth month of impregnation. A portion has been removed out of the anterior walls of the womb and membranes, to show the position of the fœtus, the course of the umbilical chord, &c.—J. S.

F. *c.* 308. The uterus of a woman enclosing a fœtus of the ninth month. From the posterior wall a flap has been raised, exposing the decidua reflexa, the chorion, and the amnion. A perpendicular cut through the anterior wall of the uterus and through the substance of the placenta, which was attached at this part, brings the fœtus into view: its head is downmost; its face looks to the left; and its back to the right side. The connection of the urinary bladder with the womb is preserved.—J. H.

F. *c.* 310. A rare form of human placenta. It consists of two separate and nearly equal parts which were connected to the opposite sides of the uterus, and the vessels of which, after a course of three inches, joined into one chord for the nutrition of a single fœtus. *The preparation was presented by the late Dr. Tuke.*—J. H.

F. *c.* 313. Human abortion about the third week, dating from the cessation of the preceding menstrual period. An opening has been made in the decidua, exposing to view the delicate, flocculent chorion. *Presented by Dr. C. Johnson.* J. H.

F. *c.* 316. Human abortion between the fifth and sixth week. The decidua vera and reflexa, the chorion and amnion, are clearly demonstrated. The fœtus, very small and hanging by its chord, is shown in the upper part of the cavity of the amnion. A smooth clot of blood is suspended in that part of the decidua which corresponds to the os tincæ *Presented by Wm. Auchinleck, Esq.*—J. S.

F. *c.* 317. The membranes of an human abortion, between the fifth and sixth week. The decidua vera, decidua reflexa, chorion, and amnion are remarkably distinct. There is no fœtus; perhaps it may have been dissolved in the liquor amnii. *Presented by Dr. C. Johnson.*—J. H.

F. *c.* 318. An aborition of the sixth week. The fœtus and membranes are all shown. *Presented to the Musæum by Dr. C. Johnson.*—J. H.

F. *c.* 320. An aborition of the sixth week. The chorion

and amnion, enclosing the fœtus, are perfect and unopened. *Presented by Dr. R. Shekleton.*—J. S.

F. *c.* 321. An abortion between the sixth and seventh week. The fœtus and membranes are preserved. *Presented by Dr. C. Johnson.*—J. H.

F. *c.* 322. An human abortion at the end of the seventh week. The fœtus and membranes are shown. *Presented by Andrew B. Maziere, Esq.*—J. H.

F. *c.* 323. An abortion at the seventh week. The decidua, chorion, and amnion are very beautiful. The little fœtus is connected by its funis: the head is large and the eye distinctly formed: a point of adhesion appears to connect the chin and sternum: the abdomen is large: the limbs short, and apparently without joints: the fingers have commenced to grow. *Dr. C. Johnson.*—J. H.

F. *c.* 324. An human fœtus and its membranes at the eighth week. The progress of development in the extremities is well shown. *Presented by Dr. R. Shekleton.*—J. H.

F. *c.* 327. A beautiful preparation of a human fœtus with its chorion, amnion, umbilical chord, &c. *Presented by G. R. Hyde, Esq.*—J. S.

F. *c.* 328. A human abortion, a few weeks after impregnation. There is no fœtus, but the decidua is very perfect, bearing the shape of the cavity of the uterus; it is closed at all parts, and the radicles of the chorion may be seen to enter it at the sides. The amnion is also distinctly formed. *Presented by J. Peebles, Esq.*—J. H.

F. *c.* 329. The membranes of an early fœtus enclosed in a coagulum, and cast off as an abortion. *Presented by Richard Gregory, Esq.*—J. H.

F. *c.* 330. A large, firm coagulum of blood discharged from the womb, with the membranes of a very early fœtus The miscarriage was brought on by a fall and fright. *Presented by Henry Haffield, Esq.*—J. H.

F. *c.* 332. Human fœtus without the membranes about the fourth month. *Presented by Dr. C. Orpen* —J. S.

F. *c.* 333. An human abortion between the third and fourth month. The membranes and the placenta appear at the top of the bottle; and the fœtus suspended by its chord rests on the bottom. The body and limbs retain exactly the same position with respect to each other, which they occupied when in the womb. *Presented by Dr. C. Johnson.*—J. H.

F. *c.* 334. An abortion of the fourth month. The fœtus is suspended and enclosed in the amnion, which is attached to

the chorion and placenta at the point of connection between the chord and these membranes. It forms a very beautiful preparation. The transparency of the membrane, and of the fluids, both inside and out, renders all parts of the fœtus visible. *Presented by J. Peebles, Esq.*—J. H.

F. *c.* 335. A fœtus and its membranes between the fourth and fifth month. The placenta is shown at the back part of the preparation, and the membranes with the fœtus inside are severally exhibited in the anterior aspect. *Presented by R. Gregory, Esq.*—J. H.

F. *c.* 340. This preparation shows the state of the uterus and its vessels immediately after giving birth to a nine-month child. The blood-vessels were fully injected with coloured wax, and the uterus and vagina, together with the rectum and urinary bladder distended and dried.—J. S.

F. *c.* 341. This is an interesting specimen of extra-uterine impregnation. It is the case of an edentulous old beggar-woman, who had carried an abdominal tumour for about twenty years, and had been for a great part of that period affected with an ulcer and swelling of one of her legs. The tumour in the abdomen had never given her much uneasiness, and had no immediate share in causing her death. Farther than this, nothing can be gathered respecting her history.

The size of the tumour, as it appears in the preparation, is nearly equal to that of a uterus at the full peroid of parturition. It lies in the substance of the right fallopian tube, near its uterine extremity, and had contracted adhesions to the abdominal parietes. Its form is irregular, and its thickness variable in different parts, being equal to that of an impregnated uterus near its connection with the womb, but very thin, behind, where the fallopian tube is spread over it. Inside the tumor, is a fœtus and its membranes : the fœtus is of the ordinary size at the ninth month, and placed with its head uppermost ; its members are all perfect, and with the exception of the eyes, the humours of which have disappeared, its flesh is as firm and fresh, as if it had been preserved from the moment of birth in strong alcohol. The deciduary membranes are present ; the placenta is attached to the posterior part of the artificial uterus ; and from the cavity of the amnion, when first opened, a large quantity of yellow flocculent fluid escaped. The real uterus may be seen at the lower part of the tumor ; it is of the usual size, and is unconnected by its cavity with that in which the fœtus was formed.—J. S.

F. *c.* 342. A preparation showing the development of a

fœtus up to the fourth month, in the right fallopian tube. Its situation is about the centre of the tube, and its separation from the true uterus is marked by a circular constriction. The individual died of hœmorrhage produced by a rupture of the walls which enclosed the fœtus. Injection thrown into the uterine vessels after death escaped in a large stream from the broken surface. The true uterus is enlarged to a size nearly great enough to have contained the fœtus; its walls are lined by a thick layer of decidua; and its mouth is plugged up with mucus.—J. S.

F. *c.* 373. A portion of one of the cornua of the uterus of a dog, containing a fully formed fœtus. The membranes and annular placenta are successfully injected and exhibited in their natural places.—J. S.

F. *c.* 374. The uterus of a dog (*King Charles's breed*) containing a large fœtus. The mother died in the act of parturition, on account of excessive obesity. The walls of that part of the uterus in which the fœtus was enclosed—the placenta, in the form of a band encircling the body of the fœtus—the chorion, and the amnion are all severally demonstrated. *Presented by the Surgeon General.*—J. H.

F. *c.* 375. The female organs of a mole (*Talpa Europea*) in situ. The uterus is horned, and the clitoris is remarkably long. The urinary bladder and the kidneys are exhibited in the preparation.

F. *c.* 377. The genital organs of a jackall (*canis aureus*) which died in the Zoological Garden, of rupture of the womb in parturition. Three fœtuses had been expelled alive and in safety, and the mother appeared to be doing well until the fifth day, when she became weak, moaned from pain, and died in a few hours. On inspection after death the following appearances were noticed. The peritoneum was inflamed universally, but more especially in the region of the pelvis, where the intestines were in some spots glued together with lymph, and in others held apart by a thin, red serum, mixed with grenish flakes. In the interior of the left cornu of the uterus there were placental marks, indicating the places of attachment from which the three living fœtuses had been separated; and all parts of this cornu appeared equally thick and fleshy. The orifice of the right cornu into the uterus was not so much dilated as that of the left; and in the cavity of this cornu lay a single fœtus, of the same size as the others, with its ring-like placenta in close and natural connection to the uterus. The structure of this cornu was somewhat different from that of the left: in

the greater part of its extent, it presented the same degree of muscular development; but in patches it was so thin, that nothing but the external serous membrane concealed the hair of the fœtus inside. These patches, few in number, scattered, irregular, of various sizes from a pea to a shilling and upwards, were only to be found on the side of the cornu, next its attachment to the broad ligament. The cause of death was found in connection with this state of parts: two of the thinned patches had given way by rupture, during the contractions of the womb; the rents were little better than an inch long, narrow, and ragged; and had permitted the escape of a considerable quantity of verdigrised fluid from the womb into the peritoneum—becoming thereby the cause of that inflammation of which the animal died. There had been no hæmorrhage into the peritoneum, as the thinning and rupture had occured before the separation of the placenta. The cornu of the uterus in the preparation is slit open in front to show the fœtus. The thinning of the walls, together with the ruptured apertures, may be seen at one side.

The three young jackalls, littered previously to the death of their mother, were put to suckle a small bitch which reared them up very tenderly.—J. H.

F. *c.* 378. The pouch of a kanguroo (*didelphis gigantea*, Gm.) with a fœtus attached to the nipple. *Presented by Professor Kirby.*—J. H.

F. *c.* 383. The uterus of a rabbit. It affords an example of a double uterus, with two horns opening separately into the vagina. Bristles point to the two horns, and to the opening of the bladder into the vagina.—J. H.

F. *c.* 384. The uterus of a rabbit in a state of impregnation. There are five fœtuses in one cornu, and none in the other. The vessels have been filled with red injection, to demonstrate the alteration in size which they undergo during the process of gestation. Those of the impregnated cornu are large and very numerous, whilst those leading to that unimpregnated, are comparatively very small and few.—J. H.

F. *c.* 385. The uterus of a rat in an early stage of impregnation. The fœtuses are all arranged along the cornua; they are more numerous on one side than on the other—they are about the size of peas, arranged at short distances from each other along the tubes.—J. S.

F. *c.* 389. The uterus of a Guinea pig impregnated. The fœtuses are arranged, like that of the rat, in the tubes of the cornua.—J. H.

F. *c.* 401. A recent impregnation of the uterus of a rein deer. The decidua is equally developed in both cornua, although a fœtus is present in one only.—*Presented by the Surgeon General*—J. H.

F. *c.* 403. The fallopian tube and ovarium of a dromedary. The extremity of the tube forms a sac which is continuous with the cavity of the peritoneum, as was demonstrated by the facility with which air introduced into the tube escaped first into the sac, and thence into the abdominal cavity. The ovarium lies loosely in the sac, being connected to it only by one side near the orifice of the fallopian tube.—J. H.

F. *c.* 405. A part of the uterus of a cow, killed while bearing a calf. Two of the glandulæ uterinæ are shown injected red. The placentulæ or cotyledons have been removed with the chorion, and the perforated surface to which they were attached is exposed. These glandulæ existed in great numbers in the uterus.—J. H.

F. *c.* 406. One of the cotyledons from the chorion of a cow, (See F. *c.* 405.) detached from its glandula uterina, and injected with blackened size. One surface exhibits numerous fine vascular fringes which fitted into the foramina of the gland, which are shown at F. *c.* 405.—J. H.

F. *c.* 407. This preparation shows the mode of connection between the cotyledons, and glandulæ of the uterus in a pregnant cow. The vessels of the uterus were filled with red, those of the placenta with black injection, and although considerable extravasation of both colored injections had taken place, in no part was that of the uterus found to have made its way into the placenta, or vice versa. The fringes of the cotyledons have been partially pulled out of the foramina on the glandulæ, to exhibit more clearly their mode of connection.—J. H.

F. *c.* 408. A preparation of a fœtal calf, at an early period, inclosed in its membranes. The vessels of the chorion are injected red to show the vascularity of the cotyledons.—J. H.

F. *c.* 409. The uterus of a cow after parturition injected and dried.—J. H.

F. *c.* 410. A dry preparation of the chorion, and cotyledons of the uterus marked 409. The vessels have been injected from the cord of different colors : they are of great size, and very numerous.—J. H.

F. *c.* 430. The female organs of generation of a porpoise (*delphinus phocæna*). The labia are preserved in the preparation—the vagina is slit open along the back, to show the rugous state of the mucous membrane—a probe marks

the os tincæ and neck of the uterus—the cornua uteri, and ovaria are exhibited near the top of the bottle.—J. S.

F. *c.* 431. The uterus of a porpoise injected and dried (*delph. phocæna.*) The animal, together with its calf about $2\frac{1}{2}$ feet long, was caught in a fishing net near Kingstown. When first taken, its teats yielded milk on being squeezed. The womb is large, and the bloodvessels supplying it and the ovaria are very much developed.—J. H.

F. *c.* 432. The nipple and part of the mammary gland of a porpoise. The nipple is concealed in a fissure of the integuments. The mamma, a small part of which only is preserved, lies under the skin, and extends in the form of a narrow thin glandular band, to the length of several feet, parallel to that of the opposite side.—J. H.

F. *c.* 433. The nipple of a whale. There are two openings on its summit. Its surface when the cuticle was first removed exhibited a fine villous structure.—*Presented to the Museum by Mr. M. Daniell.*—J. S.

F. *c.* 445. The ovaria and oviducts of the domestic hen, in situ. There are two large ova, and others of more inconsiderable size, in the ovaries. The oviducts are shown running along the back to join the cloaca.—J. S.

F. *c.* 446. The female organs of generation of a cormorand (*pelicanus carbo*). At the top of the preparation the ovarium or racemus vitellorum is so arranged as to show the calices and infundibula of the ova. Lower down may be seen the tortuous fallopian tube with which the oviduct is continuous. The delicate fold of peritoneum, which conducts the vessels to these organs, and attaches them to the spine, is spread out on the wax which supports the preparation. The oviduct terminates in the uterus, which through the medium of a short vagina opens into the cloaca, the common receptacle for the discharges from the rectum, vagina, and ureters. The opening from the rectum is distinguished by a piece of whalebone from that of the ureter into which a glass tube has been introduced.—J. H.

F. *c.* 447. A part of the coverings of the egg of a common hen (*gal. domest.*) discharged before it was perfected. Numerous small points of calcareous deposit have been formed on the external surface, the commencement of the formation of a shell.—J. H.

F. *c.* 460. The genital organs of a female land tortoise. There are two ovaria, two oviducts and two uteri. There is a large egg in each of the ovaries.—J. S.

F. *c.* 466. The ovarium of a chameleon (*lacerta chame-*

leon.) The ova are all placed in distinct compartments, suspended by peritoneum. In the month of November 1826, two of the ova covered with thin, yellowish, coriaceous shells, were discharged by the animal, after much labour. This chameleon had lived in this country for several months, and had been frequently noticed in the act of catching flies with its tongue.—J. H.

F. *c.* 467. Two cameleon's eggs, discharged during the lifetime of the animal. They are covered with thin, yellowish, coriaceous shells, of an oval shape, and about the size of the eggs of a wren. See Transactions of Royal Irish Academy, for 1828.

F. *c.* 471. Ovarium of a boa constrictor. It is long and narrow, and occupied by yellow vescicles, arranged like a row of beads.—J. H.

F. *c.* 473. The organs of generation in a female rattlesnake (*crotal horridus*). The ovaria, oviducts, cloaca, and termination of the rectum, are all shown.—J. H.

F. *c.* 474. One of the eggs of a Cobra de Capella, with a young snake coiled up within it. *Brought from India, and presented by Surgeon Barrington.*—J. H.

F. *c.* 475. One of the eggs of a Cabra de Capella, showing the young snake detached, and a part of the ovum inside the shell. *Surgeon Barrington.*—J. H.

F. *c.* 503. The organs of generation of a female shark. The ovarium of one side is prepared. The fimbriated extremity of the corresponding horn, and its uterine extremity, into which a bristle had been introduced, are rendered very manifest.—J. S.

F. *c.* 506. The genital organs of a female frog-fish (*lophius piscatorius*) after the discharge of the ova. The oviducts are of enormous size. They are in the form of two thin, membranous bags, each of which, when distended, measured from 6 to 7 feet in length, and in some places from 8 to 10 inches in diameter. They lay along the sides of the spine in the cavity of the abdomen. Anteriorly their extremities are closed, and posteriorly they open together at the anus. One side of each is fine and transparent—the opposite is thickly studded with a broad band of small, whitish, tubercles like glands. The preparation is dried and preserved in a glass-case.—J. H.

F. *c.* 507. The genital organs of a female dog-fish (*squal. canic.*) in the pregnant state. The ovarium, at the top of the bottle, contains numerous large ova. Along its side runs the fallopian tube, the fimbriated extremity of which, being

common to that of the tube opposite, was removed with it in making the dissection. The oviduct is large and vascular, and still holds two young dog-fishes, out of seven which it contained originally. There were eight in the oviduct of the side opposite, and the heads of all were directed outwards. The oviduct has been cut across at its junction with the cloaca: the preparation is injected.—J. H.

F. *c.* 508. The stomach and intestine of a fœtal dog-fish, belonging to one of those removed from the oviduct of preparation F. *c.* 507. It shows the attachment of the ovum to the duodenum above the commencement of the spiral valve, and when compared with the egg of the full size, seen at F. *c.* 510, exhibits the diminution of bulk it has undergone in contributing to the growth of the young animal.—J. H.

F. *c.* 509. A fœtal dog-fish, with the abdomen opened, to show the connection of the ovum to the intestine, and its position with respect to the liver.—J. H.

F. *c.* 510. An ovum of a dog-fish, fully grown, and removed from the ovarium of preparation F. *c.* 508.—J. H.

F. *c.* 513. A fœtal dog-fish, taken from the oviduct of its parent (*squalus caniculus*). The ovum is outside the abdominal parietes, and attached by its pedicle to the navel. When fresh the contents of the egg were quite fluid, and admitted of being pressed into the abdomen.—J. H.

F. *c.* 514. A fœtal dog-fish. The ovum has been drawn into the abdomen: a cicatrized fissure marks the point of its former attachment.—J. H.

G. *a.* 1. A full grown female human fœtus with two heads; two bodies united laterally; and only two arms, and two legs.—J. S.

G. *a.* 2. A monstrous human fœtus. There is a single head without brain—the face exhibiting a hideous double hare-lip. It has two bodies, and two perfect sets of limbs. It appears to have been about the sixth month.—J. S.

G. *a.* 3. A perfect, double fœtus. There are two heads; two sets of limbs; and two bodies united, face to face, by the heart. The heart is common to both; the aorta gives branches equally to both; and the veins from both enter into the same auricle. One diaphragm serves for both. The preparation is very old, and its history unknown.—J. S.

G. *a.* 4. Skeleton of the double child—Mary, and Catherine Corcoran—of which the cast is shown in G. *a.* 5. The heads, upper extremities and chests of both fœtuses, are perfect, and equal in size. All the bones constituting two pelves are well developed, but joined together in a curious manner. The coxyges overlap each other laterally; and in the recent state the spinal marrow was continued from the extremity of one sacrum into that of the other, making an inseparable union at this point. The pubic bones are united by symphyses, but not in the natural way. The left pubis of one fœtus is joined to the right pubis of the other, on one side—and, vice versa, on the side opposite. And the thigh bones which are articulated, two on each side, to these pelves, belong of course to their respective fœtuses. The arrangement of the skeleton is such—that if the coxyges were separated, and the pubes disunited at their unnatural symphyses, a perfect pelvis, and two perfect lower limbs might, by a new arrangement, be formed for each infant.—J. H.

G. *a.* 5. A cast of a monstrous human fœtus, consisting of two bodies united at the pelvis. The mother, Catherine Corcoran, a resident of Boyle, Co. Roscommon, was a very healthy woman, thirty years of age; and previously to giving birth to this monster, had borne five well-formed children, no two of which were twins.—The monster was born on the 24th of July 1827, at 2 o'clock, A. M., and lived till the 26th, at 2 o'clock, P. M. It appears to have nearly reached the full period of nine months. It has a head at either extremity; two chests with arms complete; two abdominal and two pelvic cavities, united end to end, with four legs placed, two at either side, where the union between the pelves occurs. There is only one anus, situate between the thighs of one side; and on the same side the urinary bladder opens above the pubis. There was only one placenta, and one umbilical chord which entered at the unnatural opening from which the urine was discharged. The infants were baptised as two—one, having dark hair, was named Mary, the other, fair haired, was distinguished by the name of Catherine—and each, in its feelings and actions, appeared independent of the other. Sometimes both cried together; at other times one cried, while the other remained tranquil—but generally they were both disposed to be quiet, unless when excited by exposure to cold air, in gratifying the curiosity of neighbours; and it would appear that the gratification of this curiosity was the principal cause of their untimely death. They each in rotation sucked from

the breast, and each in like manner frequently took milk from a spoon. They both vomited very often, and the act of emesis in one was not necessarily attended by disturbance in the stomach of the other. Their fœces were discharged from a common opening; and the urine of both flowed from the same imperfect bladder. They both used their limbs very vigorously, and the feet of one were extended, along the sides, into the arm-pits of the other. The vital spark appeared to have fled from Mary about ten minutes before the expiration of Catherine.—J. H.

G. *a.* 6. The hand of a fœtus with six fingers, all of which are well formed. The right hand exhibits the same disfiguration. On either foot were likewise six toes; and the head was affected with a hernia cerebri.—J. S.

G. *a.* 7. The foot of a human fœtus, with six toes; the hand of the same individual with six fingers is shown in G. *a.* 6.—J. H.

G. *a.* 8. Both hands of a human fœtus, with an imperfect sixth finger, growing from the inside of each little finger; the fœtus was a cyclops. The preparation showing the face is marked G. *a.* 51.—J. H.

G. *a.* 9. Human fœtus, between the second and third month, with two heads, two arms, and two lower extremities. Rudiments of two additional arms stand up from the shoulders between the heads. *Presented by Surgeon M'Evoy, Balbriggan.*—J. H.

G. *a.* 20. An acephalous human fœtus. The only parts formed are the pelvis, and lower extremities. It seems about the fourth month.—J. S.

G. *a.* 21. An anencephalous human fœtus. The calvarium and brain are wanting, and a cellular fungous mass covers the bones constituting the base of the cranium, and gives a covering to the extremities of the nerves.—J. S.

G. *a.* 22. The skeleton of an anencephalous human fœtus. The bones of the trunk, and limbs are perfect—but those constituting the roof of the skull are altogether wanting, and the cervical vertebræ are widely open behind.—J. S.

G. *a.* 23. Human fœtus, anencephalous. It is the offspring of a poor woman who never had had a living child born to her, although she had conceived three times. It is a female, and had reached the seventh month of gestation. In the birth, the placenta was obliged to be extracted, owing to its retention by an hour-glass contraction of the uterus. The entire of the calvarium and brain was absent, and the top of the head looked like the surface of a recently

cicatrized ulcer. A thin pellicle, continuous with the skin, covered a red, vascular soft substance, through some parts of which, the prominent, bony, irregularities in the base of the skull were observable. The whole ring of the foramen magnum could be seen without dissection, except at its back part, where the os occipitis was deficient. The spinal marrow and nerves were well formed; the eyes were large and prominent, and the vessels of the conjunctiva very turgid with blood. The eyelids were perfect—the superior constituting the highest point in the head; the eyeballs were also perfect; but most of the muscles, and the upper parts of the orbits were absent; the mouth was well formed; the nose complete, but flattened; and the external ears perfect, but bent a little downwards. All the other external and internal parts of the body were natural. *Presented by Surgeon Gibbons, of Moat.*—J. H.

G. *a.* 24. A female human fœtus born without a brain—though full grown, well nourished, and otherwise well formed.—J. S.

G. *a.* 25. A human fœtus, at the ninth month; it has no brain, and presents the deformity of a double hare lip.—J. S.

G. *a.* 26. A human fœtus, anencepalous. There is neither brain nor spinal marrow, and the extremities of the nerves, which appear inside the dura mater, are attached to a delicate membrane. The spinous processes of all the vertebræ are wanting, and the spinal canal is only covered in by a thin membrane, red and shining, and bearing none of the characters of skin. The nerves all through the body are perfect, and the fœtus is fully formed.—J. S.

G. *a.* 27. Human fœtus, with absence of the upper part of the skull. The brain though very deficient, is not altogether wanting. The spinal marrow is perfect.—J. H.

G. *a.* 30. A full grown, female, human fœtus with deficiency of both arms from the shoulders. Small warty eminences occupy their places. The right thigh bone is very short, and the foot twisted inwards.—J. S.

G. *a.* 31. A full grown human fœtus with deficiency of fore-arms from the elbow. The arms present little round knobs at their truncated extremities. There are only two toes on the left foot; the right is well formed.—J. S.

G. *a.* 45. The central portion of the alveolar ridge of the upper jaw of a child carrying two teeth, removed by Mr. Carmichael in an operation for double-hare-lip. Two drawings accompany the preparation—one G. *a.* 46, showing the appearance of the parts before operation; the other, 47, ex-

hibiting the great improvement effected by the treatment. *Presented by Mr. Carmichael.*—J. S.

G. *a.* 48. The head of an infant, exhibiting a hernia cerebri. The hernia is nearly half as large as the head, and consists of brain covered by the ordinary integuments of the scalp. The opening of communication between the skull and the cavity of the tumor is placed in the centre of the occipital bone. The infant lived with this affection seven weeks, gradually pining away. *Presented to the Museum by J. Creighton, Esq.*—J. S.

G. *a.* 49. A dried head of a fœtus affected with hernia cerebri. The opening of communication between the skull and the hernia, is in the centre of the occiput. The cerebral matter of the tumor was covered by the ordinary membranes of the brain, and by the common integuments. The fœtus was still-born.—J. S.

G. *a.* 50. The face of a cyclops human fœtus. In every respect it resembles that described in G. *a.* 51, except that the globes of the eyes are present, and united intimately together. A female at the ninth month. *Presented by Dr. Collins.*—J. H.

G. *a.* 51. The face of a monoculous human fœtus. It had reached the eighth month, and was born dead. The protuberance on the face—a rudiment of a nose—has been slit open, to show a cavity in its centre, lined with mucous membrane. The protuberance is attached by its root to a cartilaginous stalk, one end of which shows itself in the situation of the cribriform plate of the ethmoïd bone. On either side of the stalk, the nasal twig of the opthalmic branch of the fifth pair of nerves may be seen, running into the protuberance. The ethmoïd bone is totally wanting, and in the situation of the posterior nares, between the pterigoid plates, a fossa lined with mucous membrane is observable. The ossification of the os frontis appears to have progressed from a central point; though at the top of the bone, a notch in the centre, and diverging fibres on either side would appear to indicate, that originally the ossification had emanated as in ordinary from two points. Underneath the nasal protuberance is a single opening, bounded by four small eyelids, provided with ciliæ, cartilages, &c., and on the inner angle of each of the lower ones, is a punctum lacrymale. The orbits, by the absence of the os ethmoïdes, are thrown into one cavity, in which there are muscles and nerves for two eyes; but no globes, or optic nerves. No rudiments of either the olfactory or optic nerves could be discovered any where.

The other organs of sense were natural—the lips beautifully formed. There was water in the brain; hernia diaphragmatis; and supernumerary fingers.—J. H.

G. *a.* 52. The rectum of a human fœtus, imperforate near the anus. The obstruction exists in the canal of the gut about three lines up from the orifice, and is not more than a line and half in breadth. A depression in the skin lined with mucous membrane marks the situation of the anus; and above the obstruction, the gut is considerably wider than natural. The stricture appears equally to involve all the coats of the rectum, and in such manner as not to have altered the line of its direction. *Presented by J. Peebles, Esq.*—J. H.

G. *a.* 53. A case of malformation of the pharynx and trachea, in an infant. The pharynx, which is unusually wide, terminates below in a cul de sac, without having any connection with the œsophagus. The œsophagus takes origin from the posterior wall of the trachea, by an opening which is so smooth and wide, as to render the passage from the larynx into the stomach, as direct and easy, as that along the trachea into the lungs. *See Dublin Hosp. Reports, Vol. 5, p.* 310.—J. H.

G. *a.* 54. A human fœtus—hermaphrodite in its external characters. The vagina is nearly closed up externally. The clitoris is fully as large as an ordinarily sized penis, and presents at its root the opening of the urethra. The ovarium is placed in the labium pudendi, which is thereby enlarged so as to give to the sight and touch, the characters of a scrotum containing a testicle: preserved in spirits.—J. S.

G. *a.* 55. 56. Two casts taken by the late Mr. Shekleton from a child about ten years of age, always supposed by its parents to be a boy; and named, and educated as such. The mistake was very excusable, for the child has more the characters of a boy than a girl. It is robust and enters largely into all the amusements natural to that sex. The organ resembling the penis, is of the size natural to the age; it has a glans and moveable prepuce, and is subject to erections. It has a furrow in the situation of the orifice of the urethra; but the opening from which the urine is discharged is placed at the root of the organ. The part resembling the scrotum is moderately prominent but not pendulous; it is rugous externally, and in its interior, on one side, a body resembling a testicle may be felt, moveable like it, though smaller, and most probably, as in G. *a.* 54, an ovarium. The vagina is closed externally, but from the opening at the root of the

clitoris a probe can be made to pass in two courses, one into the bladder—the other along the vagina to the uterus. The child is still alive (1831), but has been lost sight of. The casts were taken in 1824.—J. H.

G. *a*. 62. Human fœtus, at the period of birth, in which both the lower extremities are enveloped in the same general integument, the feet at the bottom being the only parts which appear distinct. The head is large, and the cranium runs up in a pointed manner to the top. *Presented by J. Stokes, Esq.—Drawings and a cast of the monster have been made.*—J. H.

G. *a*. 65. A male fœtus between the sixth and seventh month, exhibiting unnatural development in several parts of the body. There is a hernia cerebri springing from the top of the head, and forming a tumour larger than the head itself. The walls of this tumor are formed of a prolongation of the scalp, and are shown in the preparation, emptied of the cerebral matter which in the recent state occupied their cavity. In addition, the face is hideously deformed by a fissure in the lip and palate, which is so wide and broad as to take away any appearance of distinction between the nose and mouth. The right fore-arm is wanting from a little below the elbow ; and there is no thumb on the left hand. The upper half of the body appears otherwise perfect.

The abdominal viscera are all situated outside the cavity in a thin bag, which appears to be a modification of peritoneum ; the deficiency in the abdominal walls through which this enormous hernia protrudes, is situated more towards the right than the left side. The umbilical cord comes out from the same aperture with the protruded bowels: it is straight, and after a course of between two and three inches, joins the placenta, which is preserved in the preparation. No further dissection has yet been made of the abdominal or thoracis cavities. The external parts of generation appear natural. The lower extremities are both perfect.—J. H.

G. *b*. 110. The skeleton of a monstrous kitten, beautifully prepared. The head which is single, affords attachment to two spinal columns, with which two separate bodies and corresponding limbs are connected.—J. S.

G. *b*. 111. A monstrous kitten. It presents a single head and two bodies. The bodies are connected, side by side, as far as the umbilicus. The lower jaw is split, and the tongue is double.—J. S.

G *b*. 112. A kitten, with two heads, joined side by side. The body and the extremities are naturally formed.—J. S.

G. *b.* 113. A monstrous kitten. The head is single, and deformed; the body double, consisting of two trunks joined face to face as far as the umbilicus, and having connected with it two sets of extremities.—J. S.

G. *b.* 118. The skeleton of a fœtal calf, consisting of two bodies and one head, preserved in spirits.—J. H.

G. *b.* 120. Two heads, growing together, belonging to one calf, all the other parts of which were single, and natural (in spirits).—J. S.

G. *b.* 123. The skeleton of a monstrous calf, which was born alive at the full period. It exhibits two perfect heads, two spinal columns, two tails, four sets of ribs forming one chest, four anterior limbs, one pelvis with two sacral bones, and two posterior limbs. The skeletons are opposed face to face, and the heads and necks are distinct and unconnected; but the other parts are much more mixed together and confused. There are two breast bones, common to both animals, and so placed laterally, between the skeletons, as to afford attachment for the corresponding ribs of each. The breast bone and ribs next the ground (the calf resting on its hinder legs) are the most developed, and form the greatest share of the chest—those opposite are short and incomplete, in consequence of the close approximation of the spinal columns in their neighbourhood. The pelvis has two sacral bones, superiorly, and two coxyges, the terminations of the double spinal column, closely applied together. Each of these sacrums yields an os innominatum, which descending, meets and forms, as in ordinary, a symphisis pubis. The limbs are perfect, and referrible, each, to their respective skeletons. The anterior extremities of the sternums approach closely, and are joined together by a strong ligament, the posterior are widely separated. *See* B. *c.* 371.

The muscles of the head, neck, and anterior limbs, were all complete as to number; and those arising from the sternum of one side, belonged respectively to the corresponding sides of the neck of both animals; and vice versa. The muscles of the chest were much confused at their origins. The diaphragms were united by a central tendon, which ascended so high as nearly to divide the cavity of the chest into two. This division was completed by a fibrous sheet which proceeded from the tendon to each pericardium, making two separate chests, each occupied by the proper viscera, (*See* B. *c.* 371). The muscles of the pelvis and lower extremities were all perfect, and easily demonstrable. This monster was born alive, and lived for about two hours. *Presented by Dr. Roe, Cavan.*—J. H.

G. *b.* 124. The posterior extremity of the spinal marrow taken from one of the columns of the monstrous calf marked G. *b.* 123. The nerves arising from that side which lay next the other spine are exceedingly small, whilst those from the side opposite, destined for the corresponding os innominatum and lower extremity, are large and well formed.—J. H.

G. *b.* 125. The urinary bladder, penis, and testicles of the monstrous calf, marked G. *b.* 123. This preparation has the appearance of one taken from an animal of natural, healthy formation. The two halves of all the parts are united together, as if they had been derived from the respective sides of a single calf; though in reality they are all segments from two different animals, joined together in the same manner as the sides of the skeleton are joined. The right and left sides of the bladder received nerves from different spinal systems. Of the two testicles, which are exhibited sending their vasa deferentia to the same urethra, one lay on the right side of one spine, the other on the left of the opposite; each, of course, receiving nerves from systems connected with different cerebral centres. The vesiculæ seminales may be also looked upon as not naturally formed, from their being united, though in the usual way, with vasa deferentia derived from un-matched testicles, and from their being supplied, like the two sides of the bladder, with nerves from different systems. The same may also be said of the penis, which, though apparently single, was attached by its crura to pubic bones belonging to different spinal columns, but joined into an arch in the usual manner. There were two kidneys which occupied the same relative position with respect to the spines as the testicles, and whose ureters entered the base of the bladder in the accustomed place and manner, as if they had belonged to a single calf. Rudiments of two other kidneys and of a third testicle were discernible near the pelvis, on the adjacent sides of the vertebral columns; but from the small and compressed space in which they lay, their growth had been stunted, and the development of their ducts interrupted.—J. H.

G. *b.* 126. The intestinal canal of the monstrous calf, marked G. *b.* 123, dried and preserved under a glass-case. There are two perfect stomachs: the small intestines are likewise distinct and natural for several feet, when they unite and make a single tube, which after the usual convolutions, and alterations in size, terminates at the anus.—J. H.

G. *b.* 131. A specimen of imperforate anus in a calf, at the full period. During several days which the animal survived

its birth, it passed no fœces, became swollen in the abdomen, and showed signs of much suffering from pain. An attempt made during life, to form an artificial passage with a trochar along the impervious canal, failed in its object. The preparation shows the gut reduced to a straight ligamentous chord, for about four inches from the anus; and much enlarged and dilated above the seat of obliteration. No deviations from the natural condition were discoverable in any other part of the animal.—J. H.

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* This and the following preparations, which are very striking, were procured by causing a number of silk-worms to undergo their metamorphoses separately in small glass bottles, and by intercepting the operation in different animals at different stages of its progress.

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F. c. 670. 4. The walls and interior of the cocoon exhibited, together with the exuviæ left therein by the moth during its escape. J. H. . . . . ..

F. c. 670. 5. Male and female moths of silk-worms. J. H. . . ..

F. c. 670. 6. Eggs laid by the female moth, shown in No. 5, previous to her death. J. H. . . . ..

G.

MONSTERS WITH EXCESS OF PARTS—(*human.*)

MONSTERS WITH DEFICIENCY OF PARTS—(*human.*)

MONSTERS WITH IRREGULARITY OF PARTS—(*human.*)

SPECIMENS OF MONSTERS AMONG THE LOWER ANIMALS.

page.

G. *b*. 121. Calf, . . . with two heads; skeleton of. *Donor, E. Pentland, Esq.* J. S. . . ..

G. *b*. 122. Calf, . . . with two heads; skeleton of, heart and vessels preserved. J. S. . . . ..

G. *b*. 123. Monstrous calf, . skeleton of. 154

G. *b*, 124. ——— calf, . part of the spinal marrow of. . . 155

G. *b*. 125. ——— calf, . bladder, penis, and testicles of.. . , 155

G. *b*. 126. ——— calf, . intestinal canal of. See G. *b*. 123.: dry preparation. 155

G. *b*. 127. ——— calf, . intestinal canal of. See G. *b*. 119: wet preparation. J. H. . . . ..

G. *b*. 128. ——— calf, . circulation of. See B. *c*. 371. J. H. . ..

G. *b*. 129. Dog, . . . with hernia cerebri, and fissured palate. J. H. ..

G. *b*. 130. Calf, . . . with double hare lip, and fissured palate. J. H.

G. *b*. 131. Calf, . . . imperforate anus of. 155

G. *b*. 140. Chicken, . . with two bodies, and four legs. J. S. . ..

G. *b*. 141. Young duck, . with four legs. J. S. . . . . ..

G. b. 150 Red gurnard, . imperfection in the upper jaw of. J. H. ..

APPENDIX.

A FEW SPECIMENS OF EACH OF THE GENERA

OF

TESTACEOUS MOLLUSCA,

DESIGNED TO SERVE AS ILLUSTRATIONS OF SOME PECULIARITIES OF ANIMAL ORGANIZATION.

Multivalves.

1. Chiton.—Coat-of-mail shell.

1. *Chiton granulatus,*	granulated chiton.	West Indies.
2. *Chiton* ?		South America.
3. *Chiton spinosus,*	spiny chiton.	Unknown.

2. Lepas.—Barnacle.

1. *Lepas anatifera,*	duck barnacle.	Britain, &c.
2. *Lepas diadema,*	turban barnacle.	Northern Ocean.
3. *Lepas balanus,*	common barnacle.	Britain, &c.

3. Pholas.—Piercer.

1. *Pholas dactylus,*	prickley piercer.	Britain, &c.
2. *Pholas candida,*	white piercer.	Ibid.

Bivalves.

4. Mya.—Gaper.

1. *Mya truncata,*	abrupt gaper.	Britain, &c.
2. *Mya arenaria,*	sand gaper.	Ibid.
3. *Mya margaritifera,*	pearl muscle.	Ibid.

Bivalves.

5. Solen.—Razor-shell.

1. *Solen siliqua,*	pod razor-shell.	.	Britain, &c.
2. *Solen vagina,*	the sheath.	.	Ibid.
3. *Solen ensis,*	the sword.	.	Ibid.
4. *Solen legumen,*	peas pod.	.	Ibid.

6. Tellina.—Tellen.

1. *Tellina cancellata,*	cancellated tellen.	.	Goree.
2. *Tellina radiata,*	rainbow tellen.	.	South America.
3. *Tellina ferröensis,*	carnation tellen.	.	Britain, &c.

7. Cardium.—Cockle.

1. *Cardium echinatum,*	thorny cockle.	.	Britain, &c.
2. *Cardium edule,*	common cockle.	.	Ibid.
3. *Cardium levigatum,*	smooth cockle.	.	Ibid.

8. Mactra.—Mactra.

1. *Mactra stultorum,*	simpleton's mactra.	.	Britain, &c.
2. *Mactra solida,*	strong mactra.	.	Ibid.
3. *Mactra Listeri,*	Lister's mactra.	.	Ibid.
4. *Mactra lutraria,*	large mactra.	.	Ibid.

9. Donax.—Wedge shell.

1. *Donax trunculus,*	yellow wedge-shell.	.	Britain, &c.

10. Venus.—Venus.

1. *Venus dione,*	prickly-mouthed Venus.	.	South America.
2. *Venus Islandica,*	Icelandic Venus.	.	Britain, &c.
3. *Venus mercenaria,*	money Venus.	.	North America.
4. *Venus gallina,*	hen Venus.	.	Britain, &c.

Bivalves.

11. Spondylus.—Thorny oyster.

1. Spondylus. ——— ? . . . . . .

12. Chama.—Clamp, or Clam.

1. *Chama gigas*, . giant chama. . . . Amboyna.
2. *Chama hippopus*, . spotted chama. . . Ibid.
3. *Chama cor*, . heart chama. . . . Britain, &c.

13. Arca.—Ark.

1. *Arca Noæ*, . . Noah's ark. . . . Britain, &c.
2. *Arca nucleus*, . silvery ark. . . . Ibid.
3. *Arca navicularis*. . boat-ark, ... St. Domingo.

14. Ostrea.—Oyster.

1. *Ostrea edulis*, . common oyster. . . Britain, &c.
2. *Ostrea lineata*, . lineated Oyster. . . Ibid.

15. Pecten.—Scallop.

1. *Pecten maximus*, . greatest scallop. . . Britain, &c.
2. *Pecten pleuronectes*, sole scallop. . . . Amboyna.
3. *Pecten varius*, . various scallop. . . Britain, &c.

16. Anomia.—Anomia.

1. *Anomia ephippium*. . orbicular anomia. . . Britain, &c.

17. Mytilus.—Muscle.

1. *Mytilus lithophagus*, burrowing muscle. . . E. & W. Indies.
2. *Mytilus aristatus*, . cross-beaked muscle, . Senegal.
3. *Mytilus edulis*, . common muscle. . . Britain, &c.

Bivalves.

18. Pinna.—Fin-shell.

1. *Pinna pectinata*, . spiny-ribbed pinna. . . Britain, &c.

Univalves.

19. Argonauta.—Paper sailor.

1. *Argonauta argo*, . Oriental argonaut. . . Mediterranean.

20. Nautilus.—Sailor.

1. *Nautilus pompilius*, great chambered nautilus. . Amboyna.
2. *Nautilus spirula*, . ram's horn nautilius. . West Indies.

21. Conus.—Cone.

1. *Conus monile*, . neck-lace cone. . . ..
2. *Conus* ——— ? . . . .
3. *Conus* ——— ? . . . .

22. Cypræa.—Cowry.

1. *Cypræa tigris*, . tiger cowry. . . Amboyna.
2. *Cypræa pantherina*, panther cowry. . . Mediterranean.
3. *Cypræa pediculus*, . sea-louse. . . Britain.
4. *Cypræa moneta*, . money cowry. . . East Indies.

23. Bulla.—Dipper.

1. *Bulla ovum*, . egg-dipper. . . Amboyna.
2. *Bulla ampulla*, . pewet's egg. . . Ibid.
3. *Bulla amygdalus*, . almond dipper. . West Indies.
4. *Bulla lignaria*, . brown-striated. . Britain.
5. *Bulla ficus*, . . fig-dipper. . . Amboyna.
6. *Bulla achatina*, . broad-striped dipper. . East Indies.

Univalves.

24. Voluta.—Volute.

1. *Voluta utriculus,*	gibbous volute.	.	Coromandel coast.
2. *Voluta ispidula,*	enamelled volute.	.	Moluccas.
3. *Voluta episcopalis,*	mitre volute.	.	China, Mauritius.
4. *Voluta musica,*	music volute.	.	West Indies.
5. *Voluta vespertilio,*	bat volute.	.	Ibid.
6. *Voluta undulata,*	undulated volute.	.	Australasia.
7. *Voluta corona,*	ducal-crown volute.	.	Indian Ocean.
8. *Voluta porcina,*	keel-margin volute.	.	Guinea.
9. *Voluta nivea,*	snowy volute.	.	West Indies.
10. *Voluta marmorea,*	marbled volute.	.	Ibid.
11. *Voluta mercatoria,*	clouded volute.	.	Mediterranean.

25. Buccinum.—Whilk.

1. *Buccinum saburon,*	grey casket.	.	Mediterranean.
2. *Buccinum olearium,*	tun whilk.	.	East Indies.
3. *Buccinum tuberosum,*	casket,	.	West Indies.
4. *Buccinum undatum,*	wave-ribbed.	.	Britain, &c.
5. *Buccinum lapillis,*	purple staining.	.	Ibid.
6. *Buccinum reticulatum,*	reticulated.	.	Ibid.

26. Strombus.—Screw.

1. *Strombus chiragra,*	devil's claw-screw.	.	China.
2. *Strombus bryonia,*	blunt tipped.	.	East Indies.
3. *Strombus lentiginosus,*	pink lipped.	.	Jamaica.
4. *Strombus Luhuanus,*	Luhoe broad-lip.	.	China.
5. *Strombus polyfasciatus,*	many-banded.	.	Red Sea.
6. *Strombus gigas,*	the giant.	.	West Indies.
7. *Strombus pes pelicani,*	pelican's foot.	.	Britain, &c.

27. Murex.—Rock, or trumpet-shell

1. *Murex cornutus,*	horned snipe-rock.	.	Amboyna.
2. *Murex rana,*	frog-shell.	.	Ibid.

Univalves.

3. *Murex erinaceus,*	rough-ridged	. . .	Britain, &c.
4. *Murex erinaceus,*	rough-ridged.	. .	Ibid.
5. *Murex tripterus,*	sub-triangular.	. .	Batavia.
6. *Murex parthenopus,*	tawny yellow.	. .	Naples.
7. *Murex antiquus,*	antiquated.	. . .	Britain, &c.
8. *Murex corneus,*	slender horn.	. . .	Ibid.

28. Trochus—Top-shell.

1. *Trochus niloticus,*	large marbled.	. .	Amboyna.
2. *Trochus perspectivus,*	stair-case.	. . .	Ibid.
3. *Trochus argyrostomus,*	ink-horn.	. . .	New Zealand.
4. *Trochus* ——— ?	. . . . .		..
5. *Trochus ziziphinus,*	livid top-shell.	. . .	Britain, &c.

29. Turbo.—Wreath.

1. *Turbo delphinus,*	endive leaf wreath.	. .	Amboyna.
2. *Turbo cornutus,*	large horned wreath.	.	China.
3. *Turbo mumia,*	double toothed wreath.	.	America.
4. *Turbo littoreus,*	periwinkle.	. . .	Britain, &c.

30. Helix.—Snail.

1. *Helix hortensis,*	garden snail.	. . .	Britain, &c.
2. *Helix nemoralis,*	varied snail.	. . .	Europe.

31. Nerita.—Hoof-shell, or nerite.

1. *Nerita mamilla,*	nipple nerite.	. . .	West Indies.
2. *Nerita polita*	mottled nerite.	. . .	Amboyna.
3. *Nerita glaucina,*	livid nerite.	. . .	Britain, &c

32. Haliotis.—Sea-ear.

1. *Haliotis tuberculata*	common sea-ear.	. .	Britain, &c.
2. *Haliotis iris,*	iris sea-ear.	. . .	New Zealand.

Anibalves.

33. Patella.—Limpet.

1. *Patella vulgata,*	.	common limpet.	. . Britain, &c.
2. *Patella ungarica,*	.	bonnet limpet.	. . Ibid.
3. *Patella cypria,*	.	white-ribbed limpet.	. . New Zealand.
4. *Patella fusca,*	.	sugar-loaf limpet.	. . Falkland Isles.

34. Dentalium.—Tooth-shell.

1. *Dentalium* ——— ? . . . .

35. Serpula.—Worm-shell.

1. *Serpula triquetra,*	.	three-sided worm-shell.	. Britain, &c.
2. *Serpula spirorbis,*	.	tapering spiral.	. . Ibid.

36. Teredo.—Borer.

1. *Teredo navalis,*	.	ship-borer.	. . . Bottoms of ships.

ZOOPHYTES.

The small collection of Zoophytes at present in the Museum have, for temporary convenience, been arranged after the method of *Ellis.**

I. Actinea.—Animal flower.

1. *Actinea dianthus,*	. sea carnation.	. .	Britain, &c.
2. *Actinea cereus,*	. sea torch-thistle.	. .	Ibid.
3. *Actinea anemone.*	. sea anemone.	. . .	Ibid.

II. Hydra.—Fresh-water polypi.

These animals being mycroscopic, cannot be here exhibited

III. Flustra.—The sea matt.

1. *Flustra foliacea,*	. broad-leaved sea matt.	.	Britain, &c.
2. *Flustra pilosa,*	. hairy sea matt.	. .	Ibid.

IV. Cellaria.—Celliferous coralline.

Several varieties from the sea-coast near Dublin.

V. Tubularia. Pipe coralline.

1. *Tubularia indivisa*	. oaten-pipe coralline.	. .	Britain, &c.

* See the Natural History of many curious and uncommon Zoophytes, &c.

VI. Sertularia.—Vesicular coralline.

1. *Sertularia abietina,* sea-fir coralline. . . Britain, &c.
2. *Sertularia argentea.* squirrel's-tail coralline, . Ibid.

VII. Pennatula.—Sea-pen.

1. *Pennatula* ——— ? . . . .

VIII. Gorgonia.—The Gorgon.

1. *Gorgonia pretiosa,* . True red coral . . Mediterranean.

IX. Antipathes.—Black coral.

1. *Antipathes* ——— ? . . . .

X. Isis.—Isis, or jointed coral.

1. *Isis Hippuris,* . black & white jointed coral. Indian Seas.

XI. Corallina—Coralline.

1. *Corallina officinalis* coralline of the shops. . Britain, &c.

XII. Millipora.—Millepore coral.

1. *Millipora calcarea.* chalky millepore . . Britain, &c.

XIII. Tubipora.—Pipe coral,

1. *Tubipora musica,* . red organ-pipe coral. . Red Sea, &c.
2. *Tubipora musica,* . a large specimen. . . Ibid.

XIV. Madrepora.—Madrepore coral.

1. *Madrepora annularis,*	. . . . .	..
2. *Madrepora areolata,*	. . . . .	..
3. *Madrepora galaxea,*	. . . . .	..
4. *Madrepora ampliata,*	. . . . .	..
5. *Madrepora muricata,*	. . . . .	..
6. *Madrepora muricata,*	. var. α. Ellis. . .	..
7. *Madrepora maricata,*	. var. γ. Ellis. . .	..
8. *Mrdrepora muricata,*	. var. δ. Ellis. . .	..
9. *Madrepora muricata,*	. var. ε. Ellis. . .	..
10. *Madrepora pileus,*	.	. Indian Ocean.
11. *Madrepora fungites,*	. Neptune's cap. . .	Ibid.
12. *Modrepora phrygia,*	. . . . .	
13. *Madrepora phrygia,*	. a very large specimen. .	
14. *Madrepora hirtella,*	. . . . .	Ibid.
15. *Madrepora foliosa,*	. . . . .	
16, *Madrepora,* ——— ?	See Seba, Thesaur. Tab. 112. fig. 6. . . .	..

XV. Alcyonium.—Alcyonium.

1. *Alcyonium digitatum,*	dead man's toes. . . .	Britain, &c.
2. *Alcyonium vesparium,*	sea-wasp's nest. . . .	Indian Ocean.
3. *Alcyonium vesparium,*	another specimen, 3½ feet in height. *Donor, Dr. Stokes.*	Ibid.

XVI. Spongia.—Sponge.

1. *Spongia palmata,*	. palmated sponge. . .	Britain. &c.

LIST OF CRUSTACEA

IN THE

MUSEUM OF JOHN THOMPSON, Esq. OF CORK.

PURCHASED BY THE ROYAL COLLEGE OF SURGEONS, IN 1833.

ORDER I.—DECAPODA.

Div. I.—*Brachyura, or Crabs.*

	No.	N. B.—Abbreviation: F, *Foreign*—I, *Irish*—*m*, *Male*—*f*, *Female*—*n. d.*, *Non-descript*—* *Many Specimens.*	*No. of Specimens.*
I	1	Corystes Cassivelaunus, *m.*	1
I	2	Atelecyclus Septemdentatus, *m.*	2
I	3	Carcinus Mœnas, *f.*, one in Ova.	2
F	4	.. Quadridentatus, *n. d.*, Mauritius, *f.* rare.	1
F	5	.. Emarginatus, *n. d.* West Indies, *m.*	2
I	6	Portunus *puber*, Velvet crab, *m.*	1
I	7	.. *Arcuatus*, *m.* rare.	1
I	8	.. Marmoratns, *m.*	2
I	9	.. Corrugatus, *m.*	2
I	10	.. Depurator, *m.* and *f.*	2
F	11	.. Sexdendatus, Mauritius, *n. d. m.* 1, *f.* 2.	3
F	12	.. Indicus, do. *n. d. m.* 2, *f.* 1.	3
F	13	.. Planatus, do. *n. d. m.* and *f.*	2
F	14	Lupa Pelagica, Oceanic-crab, West Indies.	1
F	15	.. Hastata, West-Indian Crab, *m.*	2
F	16	Podophthalmus Vigil, Long-eyed Crab, *m.* one, very fine and perfect.	2
I	17	Cancer Pagurus, Common Crab, *m.*	2
F	18	.. Corallinus, Coral-crab, *m.* Madagascar, 2 *f.* 1 *m.* very fine.	3
F	19	.. Maculatus, Spotted-crab, do. remarkably fine.	1
F	20	.. Æneus, Bronze, or Sculptured-crab, Mauritius, 2 *f.* 1 *m.* remarkably fine.	3
F	21	.. Do. var. Decoloratus, remarkably fine, *m.* and *f.*	2
F	22	.. Penicillifer, do. *n. d. f.* fine and rare.	1
I	23	Xantho *floridus*, imperfect.	1
F	24	.. Punctatus, Dotted-crab, Mauritius, *n. d. f.* rare.	1
F	25	.. Mauritianus, do. *n. d. m.* and *f.*	2
F	26	.. Caribbæus, West Indies, *n d. m.* and *f.*	2
F	27	... Guildingi, do. *n. d. m.*	1
F	28	Hepatus? Lobatus, Mauritius, *n. d. m.*	2
F	29	.. Pertusus, Punctured-crab, Mauritius, *n. d. m.*	1

	No.		No. of Specimens.
F	30	Calappa Tuberculata, Bashful-crab, West Indies. *f.* . .	1
F	31	.. Fornicata, Indian do. Mauritius, *m.* fine. .	2
I	32	Pilumnus Hirtellus, Hairy-crab, *m.* and *f.* rare. . .	3
F	33	Gegarcinus Ruricola, Tourlourou or Mountain Crab, West Indies, *m.* 2, *f.* 1, and a young individual .	4
F	34	.. Hydrodomus, Indian Land-crab, Madagascar, *m.* 2, *f.* 1, the males with the large claw on opposite sides, very fine and rare. . .	3
F	35	Cardisoma Carnifex, Great Land-crab, Barbadoes, *m.* with the large claw on opposite sides.	2
I	36	Pinnotheres Pisum vel Mytilorum, Pea-crab, *m.* 4, *f.* 3. .	7
I	37	.. *Pinnæ*. Pinna-keeper, mutilated. . .	1
F	38	Ocypoda Ceratophthalmus, Horn-eyed Racing-crab, Madagascar, fine.	1
F	39	Gelasimus Pugilator, Soldier or Fiddler-crab, West Indies. *m.* and *f.*	2
F	40	.. Mauritianus, *m.* 4, *f.* 1, the latter rare. .	5
F	41	.. Indicus, *n. d. m.* rare.	2
I	42	Gonoplax, *Bispinosa*, Angular-crab, *f.* imperfect, rare. .	1
F	43	Eriphia Caribbæa, West Indian Amphibious-crab, *n. d. m.* 2, *f.* 2.	4
F	44	.. Guildingi, West Indies, *n. d. m.* and *f.* . .	2
F	45	Plagusia Clavimana, Flat-crab, West Indies, *m.* 2, *f.* 2. .	4
F	46	.. Depressa, Indian Ocean, *f.* rare and valuable. .	1
F	47	Thelphusa Erythropus, *n. d.* Mauritius, *m.* 2, *f.* 1, fine. .	3
F	48	Grapsus Pictus, Painted-crab, West Indies, Exuvia of. *f.* 1, *m.* 2.	3
F	49	.. Indicus, Indian Grapsus, *n. d. m.* 2. *f.* 1, fine. .	3
F	50	.. Floridus, Ruddy G. *n. d.* Mauritius, *f.* 2, *m.* 1 fine.	3
F	51	.. Pelagicus, Oceanic G. *n. d.* Gulph-stream, *m.* 2, *f.* 2.	4
F	52	.. Elegans, Elegant Grapsus, Barbadoes, *n. d. m.* 2, *f.* 1, males very fine.	3
F	53	.. Variegatus, Mauritius, *n. d. f.* rare. . .	1
F	54	Ranina Serrata, Frog-crab, Mauritius, rare and valuable.	1
F	55	Parthenope Horrida, Horrid Crab, Mauritius, *m.* . .	2
I	56	Maia Squinado, Spiny or King-crab, *m.* and *f.* . .	2
F	57	Pisa Cornuta, Horned-crab, West Indies, *m.* fine and rare .	1
F	58	.. Caribbæa, *n. d.* do. *m.* 2, *f.* 2.	4
I	59	Hyas Araneus, Great Spider-crab, *m.* and *f.* 2. . .	2
I	60	.. Coarctata, *m.* and *f.*	2
F	61	Mithrax Spinicinctus, West Indies, *f.* very fine. . .	1
F	62	.. Caribbæa, *n. d.* do. *m.* 2. *f.* 2. . .	4
I	63	Inachus Scorpio vel Dorsettensis, Scorpion-crab, *m.* .	1
I	64	Achæus Cranchii, rare.	
I	65	Macropodia Phalangium, Long-legged Spider-crab, *m.* 2, *f.* 1.	3
F	66	Leptopodia Caribbæa, *n. d.* West Indies, *m.* 2, *f.* 1. .	3
F	67	Doclea Rissonii, Mauritius, rare.	1
I	68	Ebalia Pennantii, Hard or Stone-crab, *f.* . . .	2

Div. 2.—Macroura.

F	69	Albunea Scutellata, West Indies, *f.* fine and rare. .	1
F	70	Remipes Testudinarius, do. *m.* and *f.* the latter with ova, rare.	2

	No.		No. of Specimens.
I	71	Pagurus Bernhardus, Hermit-crab.	2
F	72	.. Punctulatus, Ocellated H. Crab, Madagascar, one female out of its domicile to exhibit the hinder parts, fine.	3
F	73	.. Rubescens, Mauritius, *n.d.*	2
F	74	.. Coni, do. *n.d.* very rare.	2
F	75	.. Annulatus, Banded H. Crab, Mauritius, *n.d.* very fine and rare.	1
F	76	.. Olivæ, West Indies, *n.d.*	2
I	77	.. Erinaceus, *n.d.*	1
F	78	Scyllarus Crenatus, Madagascar, *n.d. f.* with ova, rare.	2
F	79	Palinurus Penicillatus, Painted Craw-fish, Mauritius, *m.* 2, *f.* 1, extremely fine and perfect.	3
I	80	Galathea Strigosa.	1
I	81	.. Squamifera (*in spirits*), Little Galathea.	3
I	82	.. *Rugosa*, Long-armed G. imperfect.	1
I	83	Porcellana Linnæana, Porcelain-crab, *m.* 4, *f.* 1.	5
F	84	.. Delhostii, West Indies, *n.d.* rare.	2
F	85	.. Guildingi, do. *n.d.* rare.	3
I	86	Thalassina Montagui, imperfect (*in spirits*).	1
F	87	Calianassa Delhostii, West Indies, *n.d.* rare.	2
F	88	.. Caribbæa, West Indies, *n.d. m.* and *f.* some in ova (*in spirits*).	6
F	89	.. Guildingi, West Indies, *n.d. f.* with mature ova (*in spirits*).	1
I	90	Astacus Fluviatilis, River Craw-fish, *m.* 1, *f.* 2.	3
I	91	Crangon Vulgaris, Shrimp, *m.* and *f.* (*in spirits*)	8
F	92	.. Pelagicus, Oceanic Shrimp, Gulph-stream, (*in spirits*).	2
I	93	Pontophilus Spinosus, (*in spirits*).	2
I	94	Pandalus Annulicornis, *m.* and *f.* (*in spirits*).	8
F	95	.. Caribbæus, West Indies, (*in spirits*), *m.* and *f.*	5
I	96	Hyppolita Varians, Variable Shrimp, *m.* and *f.* (*in spirits*).	*
I	97	.. Cranchii, *m.* and *f.* (*in spirits*).	*
F	98	.. Fucorum, Gulph-stream, *m* and *f.* (*in spirits*).	*
F	99	Peneus Macrophthalmus, West Indies, *n.d.* rare (*in spirits*).	1
I	100	Processa (vel Nika) Caniculata, *m.* and *f.* (*in spirits*).	*
I	101	Palæmon Serratus, Prawn, (*in spirits*).	3
I	102	.. Leachii, *n.d.* (*in spirits*).	2
F	103	.. Jamaicensis, West Indian Prawn.	3
F	104	.. Armatus, Oceanic Prawn, Gulph-stream, *m* and *f.* (*in spirits*).	4

Div. 3.—*Shipozoda (in spirits.)*

I	105	Mysis Chameleon, *m.* and *f.*	1
I	106	Scorpionura Vulgaris.	*
I	107	.. Longicornis, *n.d.*	*
I	108	.. Maxima, *n.d.*	1

	No.	ORDER II. STOMOPODA.	No. of Specimens.
F	109	Squilla Fusca, Brown Sea-Mantis, Maurit. *n.d. m.* and *f.* .	2
F	110	Chiragra Erythropa, Mauritius, rare and valuable, *f. n.d.* .	1
F	111	.. Caribbæa, West Indies, *m.* and *f.* and a young individual.	3
		ORDER III. AMPHIPODA, IN SPIRITS.	
F	112	Phronima Sedentaria, Atlantic Ocean, in Salpa, rare. .	*
I	113	Orchestia Littoria, *m. f.*	*
I	114	Gamarus Locusta, *m. f.*	*
I	115	Corophium Longicorne, *m. f.*	
		ORDER IV. PSEUDOPODA, IN SPIRITS.	
I	116	Caprella Phasma, *m. f.*	
		ORDER V. ISOPODA.	
I	117	Anceus Maxillosus, *in spirits.*	*
I	118	Idotea Entomon.	2
I	(2)	.. Tricuspidata.	2
F	119	.. Spatulata, West Indies.	2
I	120	Stenosoma Lineare.	2
I	121	Spæroma Hookeri, *in spirits, m.* and *f.*	*
I	122	Limnoria Terebrans, *in spirits, m.* and *f.* . . .	*
I	123	Ligia Oceanica.	
I	124	Philoscia Muscorum.	1
I	125	Oniscus Asellus, Woodlouse.	1
I	126	Armadillo Vulgaris, Millepede.	1
I	127	Bopyrus Galathea, *f.* with hatching ova, *in spirits, n.d.* .	1
F	128	.. Caribbæa, with Pandalus Caribbæus, *n.d. in spirits.*	2
		ORDER VI. ENTOMOSTRACA IN SPIRITS.	
I	129	Dichelestion Sturionis	3
I	130	Sacculina Carcini, *n. d.*	2

	No.		No. of Specimens.
I	131	Caligus Salaris, *f.* with ova, *f.* 3. *m.* 1.	4
I	132	.. Scombri, *f.*	*
I	133	Lernea Branchialis.	1
I	134	Foroculum Spratti	3
I	135	Entomoda Canicula, *n.d.*	1
I	136	.. Puella, *n.d.*	1
	137	Apus Cancriformis, English.	1
F	138	.. Guildingi, W. Indies, *n.d.*	*
	139	Artemis Salinus, English.	*

ORDER VII.

CIRRHOPODA.

Division 1.—*Lepades*, Barnacles.

F	140	Otion, Long-eared, Mediterranean, *in spirits.*	3
F	141	.. Short-eared, Mediterranean, *in spirits.*	3
F	142	Cineras Vittatus, Mediterranean, *in spirits.*	*
	143		
F	144	Lepas, or Pentalasmus Anatifera, Mediterranean, *in spirits.*	4
F	145	.. Anserifera, Atlantic Ocean.	2
F	146	.. Denticulata, Mediterranean.	2
F	147	.. Curtipes, Atlantic Ocean.	2
F	148	.. Medius, do.	2
F	149	.. Striatus, do. *group.*	1
F	150	Pigmeus on Antipathes, Madagascar, *n.d.*	3
F	151	Lythotria, West Indies, *in spirits.*	4

Division 2.—*Balanus*, Acornshell.

F	152	Balanus Tulipa, Madagascar, *group.*	1
F	153	.. Tintinabulum, Atlantic Ocean.	6
F	154	.. Eburneus, do.	6
F	155	.. Vulgaris.	3
I	156	.. Balanoïdes, *groups.*	3
I	157	.. Costatus *group.*	1
F	158	.. Cylindrus, West Indies, *n.d.*	6
	159	.. Galericulatus on Antipathes, Madagascar.	3
	160	Acasta in Sponge, Madagascar.	2
	161	Pyrgoma in Madrepore, West Indies.	1

	No.	ADDENDA.	No. of Specimens.
		1st.—TO BRACHYURA, *in spirits.*	
I	162	Euronyme Aspera, Rough-crab, *m.* 2, *f.* 1, rare, dry. .	3
I	163	Young of Carcinus Mænas, after 2nd Metamorphosis .	2
I	164	Megalopa Estuorum.	*
	165		
	166	Females of Pea-crab in ova.	5
F	167	Hatching Ova, or Zoe of Gegarcinus Hydrodomus, *n. d.* .	*
F	168	Female Thelphusa. with Hatching Ova, *n.d.* . . .	*
		2d.—TO MACROURA.	
		From Class ARACHNIDES, *in Spirits.*	
I	169	Ammothea Æruginosa.	*
I	170	Nymphon, two species.	3

A

COLLECTION OF WAX MODELS,

ILLUSTRATIVE OF THE STRUCTURE OF SEVERAL PARTS OF THE HUMAN BODY,

PRESENTED TO THE

MUSEUM OF THE ROYAL COLLEGE OF SURGEONS IN IRELAND,

BY

HIS GRACE THE DUKE OF NORTHUMBERLAND,

WHEN LORD LIEUTENANT OF IRELAND.

No. 1.—A preparation in wax, of the natural size, demonstrating the superficial lymphatics of the head, neck, left upper extremity and chest; together with the parts, with which these vessels are in immediate connection.

The following is a brief enumeration of the principal objects in the preparation. On the head are represented—the labial, temporal, and occipital arteries of the left side, with their accompanying lymphatics discharging themselves into the lymphatic glands under and behind the ramus of the lower jaw; the Whartonian duct; the occipito-frontalis muscle, and all the muscles of the face. In the neck, the lymphatics, coursing along the internal jugular vein, and joining the great thoracic duct, are shown. In this region, the larynx, trachea, œsophagus, thyroid gland, subclavian artery, and several muscles are accurately represented.

In the palm of the hand are shown—the superficial lymphatic vessels, the arches of arteries and nerves, even to their finest terminations at the tips of the fingers, the annular ligament, and the

superficial tendons, and muscles. We see represented in the fore-arm, the pronator and supinator muscles, the radial and ulnar arteries with many of their branches, the superficial veins, and numerous lymphatics, deep as well as superficial. Ascending to the arm, we discover, as in a recent dissection, the brachial artery, with its branches, the superior and inferior recurrents, and anastomotica magna, holding their natural relations to the muscles, nerves, and basilic and cephalic veins: here also we get a view of the numerous lymphatics, continuing their course from the fore-arm towards the axilla. The muscles and clavicle forming the anterior wall of the axilla, are represented as divided and turned outwards, so as to expose the axillary artery, veins, and nerves, together with the lymphatic vessels ascending from the arm, and those coming from the side of the chest, in company with the external thoracic arteries, to join the different sets of axillary glands. The lymphatics are all shown discharging finally into the thoracic duct, near to the termination of that vessel in the angle between the subclavian and jugular veins. — *Talrich, Paris.*

No. 2.—A beautiful model, designed to show the superficial lymphatic vessels and glands of the right lower extremity. The limb is made to appear standing erect, and stripped of the integuments in such a manner as to exhibit all the muscles which give it form; and together with them, the superficial veins, and lymphatics from the toes up to the pelvis. In the groin, the junction of the superficial veins and lymphatic vessels with those more deeply seated, and their common passage with the femoral artery under Poupart's ligament, is represented. The parts shown within the pelvis are the following: the psoas, iliacus, pyramidalis, obturator internus muscles, and sacral plexus of nerves *Talrich.*

No. 3.—Represents: the head, the deep muscles of the neck, the larynx and the pharynx, drawn aside by a tenaculum; on the left side, the clavicle, scapula and latissimus dorsi; on the right, the shoulder entire—the arm cut off at three inches below the articulation. The thorax—the sternum divided, so as to expose the

cavity of the chest, the internal intercostal muscles, the vena azygos, the superior surface of the diaphragm, the intercostal arteries, the entry into the chest of the œsophagus and trachea, and the exit of the carotid and sub-clavian arteries. The abdominal cavity deprived of its organs, to allow the following objects to be seen: the inferior surface of the diaphragm; the passage of the inferior vena cava, and that of the œsophagus, and of the aorta; the diaphragmatic arteries, the psoas major, psoas minor, quadratus and transversalis muscles; the lumbar arteries and veins, and the cœliac axis. The cavity of the pelvis, with the iliacus, obturator internus, obturator externus, pectineus, and quadratus femoris; the attachments of the penis, acceleratores urinæ, and transversales perinei; the superficial sphinctor of the anus, the levator ani, the pudic artery, and the transverse artery of the perineum, &c. &c. *Talrich.*

No. 4—Model of a female, from about four inches above the xyphoïd cartilage to the middle of the thighs; exhibiting the womb at the $4\frac{1}{2}$ month of pregnancy, and opened anteriorly to show the fœtus, the placenta, and the membranes. Before the womb, the bladder may be observed; behind, the rectum. In the abdominal cavity may be seen, the inferior surface of the liver, the gall-bladder, the cystic and hepatic ducts, the left side of the inferior surface of the diaphragm, the aorta and its inferior bifurcation, the coronary artery of the stomach, the splenic and hepatic, the superior and inferior mesenteric, the renal artery and that going to the ovarium, the inferior vena cava in all its extent, the middle sacral artery, the kidneys, the ureters, the psoas and the iliac muscles. *Talrich.*

No. 5.—The bust of a female, representing; first, a horizontal section of the brain, in which are exhibited the cortical and medullary substances, the corpus callosum inverted, the arch of the fornix inverted, the corpora striata, the optic thalami, the tænia semi-circularis, the commencement of the third ventricle, the

septum lucidum, with the fifth ventricle between its layers. Secondly, the neck, in which are shown the carotid artery and its ramifications, the external and internal jugular veins and their ramifications, the laryngeal nerves, the pneumo-gastric and its ramifications, the sterno-mastoid muscle, the larynx, the pharynx and the muscles above and below the os hyoïdes. Thirdly, the mammæ, of which one is exhibited, entire; and the other, dissected to demonstrate the mammary gland, with its vessels, nerves, nipple, and lactiferous ducts. *Talrich.*

No. 6.—The bust of a man, in which we discover the muscles of the neck, the vessels and the nerves; to render perfect the view of the relations of the internal jugular vein, in reference to the pneumo-gastric nerve, and the superior and inferior cardiac nerves, the internal jugular is cut and turned aside in the preceding preparation, whilst, in this, it holds its natural place, and connections. *Talrich.*

No. 7.—A model of the pelvis in a man, showing the following objects: First, the interior of the cavity, its organs covered by peritoneum, and the posterior surface of the abdominal muscles, with the depressions in the peritoneum corresponding to the superior apertures of the inguinal and crural canals. Secondly, the aponeuroses of the external and internal oblique muscles, Pouparts ligament; the inferior aperture of the inguinal canal; the inguinal canal; Gimbernaut's ligament; the crural canal; the relations of the epigastric artery, with the spermatic chord; the crural artery, vein and nerve; the exit from the pelvis of the psoas and iliac muscles; the horizontal ramus of the pubis; the hip joints cut open anteriorly; the penis; the spermatic chord with its tunics dissected; the testicle; the epididymis, and the tunica vaginalis testis laid open. The sections of the thighs exhibit two views of the muscles as they appear when cut across in the circular operation for amputation of this part of the limb. The preparation is principally important as demonstrating the anatomy and operations of inguinal and crural hernia. *Talrich.*

No. 8.—A preparation representing the penis, the testicles, and an oblique inguinal hernia seen externally. *Talrich.*

No. 9.—A model representing the penis, the testicles, and an inguinal hernia, from which the skin has been removed, and the sac reflected so as to exhibit the intestine. *Talrich.*

No. 10.—A model of the penis, the testicle, and an inguinal hernia, fully dissected to demonstrate the relations of the sac with the spermatic chord, the tunics of the testicle, the crural canal and the inguinal aponeuroses. The 7th, 8th, 9th, and 10th, form together a complete history of this form of hernia. *Talrich.*

No. 11.—The pelvis of a woman deprived of all its soft parts, and in which we find arranged naturally, the terminations of the aorta, and of the inferior vena cava, the rectum, the womb, the bladder, the external genital parts, and the iliac fossæ emptied of the muscles. *Talrich.*

No. 12.—A vertical section of the pelvis of a woman. On the left side are to be seen, divided vertically, the urinary bladder, the canal of the urethra, the vagina, the womb, and the rectum ; on the right side, the organs have been removed to exhibit the vessels, the nerves, and the muscles of the pelvis. *This model was executed in Paris, from plates published by* Doctor Houston. *Talrich.*

No. 13.—A vertical section of the pelvis of a woman. On the right side are to be found, the organs ; and on the left, the vessels, the nerves, and the muscles of the pelvis. This model is the counterpart of the preceding. *Talrich.*

No. 14.—A lateral view of the pelvis of a virgin, with its contents, viz. the uterus, broad ligaments, ovaria, fallopian tubes, vagina laid open at the side, os tincæ, labia, &c. ; the urinary bladder, distended ; the rectum, surrounded at the extremity by the sphinctor ani, and covered higher up by the longitudinal mus-

cular fibres; and lastly, the folds of peritoneum enveloping all these parts. *Purchased from* A. Schloss, *Importer of Anatomical Preparations in Wax. London.*

No. 15.—A model of the uterus, broad ligaments, fallopian tubes, and ovaria, at the age of puberty. *Schloss.*

No. 16.—A model of the same parts at the same age, representing them as laid open in dissection. *Schloss.*

No. 17.—A model of a uterus, recently after parturition. The cavity is opened by a vertical incision; and, by a section into the ovarium, a corpus luteum has been brought into view. *Schloss.*

No. 18.—A representation of a vertical section of the pelvis and its organs in a man. We here see, on the left side, the testicle, the penis, the corpus cavernosum, the canal of the urethra in all its length, the prostate gland, the vesiculæ seminales, the external and internal surfaces of the bladder, the spermatic chord, the vas deferens, and the rectum; on the right, the vessels, the nerves and the muscles of the pelvis. *Executed from the plates of* Doctor Houston. *Talrich.*

No. 19.—A beautiful model of the head, on which may be studied—on the right, the muscles, the arteries, the veins, and the branches of the portio dura, supra-orbital, infra-orbital, and submental nerves; on the left, the temporal muscle, the external maxillary artery, the quadratus genæ, the corrugator supercilii, the levator palpebræ superioris, the pyramidalis nasi, the anterior opening of the nasal fossæ, the nasal duct, and the supra and infra-orbital vessels. *Talrich.*

No. 20.—A model of the superior surface of the liver, exhibiting the suspensory ligament, the gall-bladder, and the lymphatic vessels on the surface of these parts. *Talrich.*

No. 21.—A wax preparation, demonstrating the stomach, the inferior surface of the liver, the gall-bladder, the kidneys, and portions of the aorta, vena cava, and vena porta corresponding thereto, together with the arteries and lymphatic vessels of all those parts. *Talrich.*

No. 22.—A representation of a portion of the jejunum with its mesentery, showing the arteries, veins, nerves, and lacteals, successfully injected. *Talrich.*

No. 23.—A model of the human brain, exhibited lying on the hemispheres with the base turned up, and representing the following objects;—the anterior and middle lobes, with the cerebellum resting on the posterior lobe, the olfactory nerves and ganglia, the optic nerves and commissure, the tuber cinereum and infundibulum of the pituitary gland, the corpora mamillaria, the locus niger, the origins of the third pair of nerves, the long and slender fourth pair, the pons Varolii and the double roots of the fifth pair attached thereto, the fissure between the pons and medulla oblongata, and lying in which, appear the origins of the sixth and seventh pairs; next behind these are the corpora pyramidalia of the medulla oblongata, touching each other by their inner margins and separated at the sides from the corpora olivaria by the origins of the ninth pair of nerves; more laterally still are shown the corpora restiformia with the roots of the eighth pair interposed between them and the corpora olivaria. The convolutions of the brain and laminæ of the cerebellum are well represented. Transverse sections of the great longitudinal sinus of the dura mater are given, showing the difference in its size and form, at the fore and back-part of the head. *Schloss.*

No. 24.—A model exhibiting the parts of the brain brought into view by a vertical, antero-posterior section in the mesian line; viz. the corpus callosum and fornix united posteriorly, but distant from each other anteriorly by the depth of the fifth ventricle; the side of the optic thalamus constituting the lateral boundary of the

third ventricle; sections of the pineal gland, and corpora quadrigemina, under which appears, in the section, the iter a tertio ad quartum ventriculum. The fourth ventricle is also shown, bounded behind by the inferior vermiform process of the cerebellum, and anteriorly by the medulla oblongata and pons. In this part of the section, the arrangement of white and grey matter in the structure of the pons and medulla oblongata is shown. In the base of the brain, appear, the first and second pairs of nerves, the tuber cinereum, the corpora mamillaria, and the third, fourth, fifth, sixth, seventh, eighth, and ninth nerves. *Schloss.*

No. 25.—Two antero-posterior, vertical sections, representing the interior of the right hemisphere of the brain, &c. One gives an exhibition of the parts in the mesian line, with the convolutions unfolded, viz. the corpus callosum, with the fibres extending from it laterally, anteriorly, and posteriorly, into the hemispheres. Under the corpus callosum, are represented, the corpus striatum ; the fornix united anteriorly by one branch to the reflected corpus callosum, and descending by the other—the anterior pillar—to join the corpus mamillare ; a section of the anterior commissure appears in the angle of separation formed between these branches : the continuation of one of the posterior pillars of the fornix with the hippocampus major, and its descent into the inferior horn of the lateral ventricle are likewise demonstrated. Under the fornix are shown, the optic thalami, and a section of the nates with the pineal gland resting thereon. The trunk of the right optic nerve, between the anterior and middle lobe, is represented. The second view is on the other, or outer side of the preparation. It shows the radiated and fibrous arrangement of the medullary matter in the substance of the hemispheres and convolutions. *Schloss.*

No. 26.—A horizontal section of the brain, exhibiting the arrangement of the white and grey matter in the convolutions ; showing also, the corpus striatum ; and the choroid plexus resting on the optic thalamus, and descending at each side on the surface of the hippocampus major to the bottom of the inferior horn of

the lateral ventricle. The velum interpositum is shown, covering the vena magna Galeni, the pineal gland and its peduncles, the corpora quadrigemina, and the optic thalami: the tænia semicircularis is represented, lying in the furrow between the corpus striatum and optic thalamus. The cerebellum appears in the space between the posterior lobes of the hemispheres. *Schloss.*

No. 27.—A model exhibiting the brain in two views. A horizontal section shows, in the superior view, the structure of the cerebellum, and the corpus dentatum; the valve of Vieussens; the tubercula quadrigemina; the processus a cerebello ad testes; the optic thalami; the third ventricle; the anterior pillars of the fornix; the corpora striata, and the anterior horns of the lateral ventricles. Inferiorly, are shown the medulla oblongata, with the corpora pyramidalia, olivaria, and restiformia; also the pons Varolii, crura cerebelli, fourth ventricle, calamus scriptorius, inferior vermiform process, and inferior surface of the valve of Vieussens; farther forward are likewise shown, the crura cerebri, locus niger or perforatus, corpora mamillaria, tuber cinereum, optic ganglion, and olfactory nerves. *Schloss.*

No. 28.—The brain shown in two views—one from above, the other from below. In the superior view, are exhibited, the corpus callosum; the centra ovalia; the arrangement of the medullary and cineritious matter; the punctæ sanguineæ, &c. Inferiorly, the lateral ventricles, in all their extent, are opened from below, so as to demonstrate the inferior surface of the corpus callosum with its raphe and lineæ transversæ; also the origins of the optic nerves, the tractus opticus, and the junction of these nerves anteriorly; at which point one of them is cut across. A vertical, antero-posterior section, through the pons Varolii, corpora quadrigemina and pineal gland exhibits, the structure of these parts, and the position of the iter a tertio ad quartum ventriculum between the two former; it exhibits, also, the peduncles of the pineal gland, running along the margins of the optic thalami and joining the anterior pillars of the fornix, as the latter are descending to be

united to the corpora mamillaria. The descending pillars have been cut across, and in front of them, near the point of section, may be observed, on each side, the attachments of the divided commissura anterior, at the junction between the corpora striata and optic thalami. The arrangement of the fibres in the interior of the ventricles and hemispheres is exhibited. The origins of the third pair of nerves, from a point behind the corpora mamillaria, and the origins of the first pair, from the fissura Sylvii and anterior lobes, are demonstrated. *Schloss.*

Nos. 29 and 30.—Two small preparations, showing the anatomy of the third and fourth ventricles, &c. No. 29 gives an accurate representation of the corpora striata ; the optic thalami, partially united by the commissura mollis forming the roof of the third ventricle ; the pineal gland, and its peduncles ; the corpora quadrigemina ; and the valve of Vieussens forming the roof of the fourth ventricle, and giving origin to the fourth pair of nerves. The superior surface of the cerebellum is also represented. No. 30 exhibits the same parts divided by a horizontal section, and showing, the corpus striatum ; the optic thalami and third ventricle between them ; the testes, and processes passing therefrom to the cerebellum ; the fourth ventricle; and the calamus scriptorius. *Schloss.*

No. 31.—A beautiful preparation in wax, *by M. Dupont, Paris* ; showing. 1st. In the cerebral region ; the left half of the base of the brain ; its convolutions covered by arachnoid membrane and pia mater holding numerous veins ; some folds of the dura mater, &c.

2dly. In the orbital region (the external wall of the orbit removed) ; the globe of the eye ; the optic nerve ; the lachrymal gland and ducts ; the levator palpebræ superioris ; the superior, the internal, the inferior, and the external recti muscles ; the inferior oblique ; and the superior oblique, with its trochleator tendon. There are further shown, most satisfactorily—the frontal branch of the opthalmic division of the fifth pair of nerves, dividing into the

supra-trochleator, and superciliary; the nasal branch of the same nerve furnishing a filament to the lenticular ganglion, and then dividing, on the upper surface of the optic nerve, into the nasal twig and the infra-trochleator twig; and the lacrymal branch, advancing towards the lacrymal gland, and dividing into several filaments which enter its structure. Next, the fourth nerve, much concealed, running along the margin of the superior oblique muscle, on the orbital surface of which it is distributed. The sixth nerve, at the outside, ramifying on the ocular surface of the external rectus. The third nerve, supplying with filaments the levator palpebræ, the superior, the internal, and the inferior rectus, and sending a long branch to the obliquus inferior; and also a branch from this latter to the posterior inferior angle of the lenticular ganglion. The lenticular ganglion is represented, lying on the outer side of the optic nerve, and opposite the space between the superior and external recti muscles, which are pulled asunder for its exhibition: a filament from the nasal nerve, and one from that branch of the third pair, which supplies the inferior oblique muscle, join it, posteriorly; and from its anterior margin, the long, fine, ciliary nerves arise and run forward to the globe of the eye.

3dly. In the facial region are represented, the nose; the alveoli and teeth of the upper jaw; the membrane of the antrum maxillare; and the passage of the superior maxillary nerve along a canal in the bone between the antrum and orbit. Between the antrum, and the ridge of the external pterygoid process posterior to it, is shown the spheno-maxillary space, at the top of which the ganglion of Meckel is represented, receiving two short, fine filaments from the infra-orbital nerve.

And, 4thly. In the cervical region are shown, the internal carotid artery entering and winding through the tortuous canal of the petrous bone, and accompanied by filaments from the superior cervical ganglion of the sympathetic nerve, which form, by their union on the side of the artery, when about half way along the canal, a small quadrilateral ganglion: on a plane more posteriorly, are represented, the skin of the scalp, and the cells of the mastoid process;

the origins and part of the flesh of the sterno-mastoid and digastric muscles, and also of most of the deep muscles in the upper part of the cervical region : resting on these muscles, appear, the internal jugular vein, divided about an inch from the foramen lacerum; the superior cervical ganglion of the sympathetic nerve, sending off short branches to form arches of communication with the three first cervical nerves ; also branches to the pharyngeal plexus ; two or three long fine branches, which descend on the surface of the deep muscles—the cardiac nerves ; and lastly, the filaments which accompany the internal carotid artery. Here, likewise, are shown, the glosso-pharyngeal nerve, running forwards to the side of the pharynx ; the spinal accessory turning backwards, and cut short at the place where it rests on the superior cervical ganglion ; and the par vagum, the largest of all, running straight downwards, and furnishing, high in the neck, the branch termed superior laryngeal. The anterior branches of the three first cervical nerves are shown, leaving the intervertebral foramina, and forming arches of communication with each other, and with the sympathetic, and descendens noni. On a plane more forwards in the cervical region, are represented ; the constrictors of the pharynx, the œsophagus, the muscles of the tongue and os hyoïdes, and the external muscles of the larynx ; and resting thereon, the following nervous filaments ; 1st, the gustatory nerve, a part of which only is shown ; 2nd, the lingual, crossing the other nerves to reach its destination in the tongue, and furnishing in its course the descendens noni branch, which subdivides and anastomoses with the second and third cervical nerves ; 3d, the glosso-pharyngeal, situated somewhat deeply ; and 4th, the superior laryngeal, sending some branches to the interior of the larynx, and others to the muscles on the outside of that organ. *Dupont.*

No. 32.—A model of the parts constituting the organ of hearing in an adult human body, magnified to four times the natural size. Of the external ear, the helix and ante-helix, the tragus and ante-tragus, the lobe, the fossa navicularis, and the concha, together with the retractor and elevator muscles, are represented. Next in

order is shown, the meatus auditorius externus, partly cartilaginous, and partly bony, passing in a direction inwards and forwards, and closed at the extremity by the membrana tympani: this membrane, placed slantingly and somewhat concave on the outer surface, is represented as nearly transparent and furnished with numerous fine bloodvessels, to betoken its delicate and organized nature. The squamous, the mastoid, and the zygomatic processes of the temporal bone are entire; the petrous portion is dissected, to demonstrate the cavity of the tympanum, the labyrinth, the nerves, &c. In the cavity of the tympanum, are shown—the *malleus*, attached vertically by its long handle to the upper half of the membrana tympani, and by its articular cavity to the incus; sending forwards its processus gracilis; and giving insertion to its external and internal muscles; the *incus*, articulated by its concavity to the head of the malleus, and by its long descending crus to the stapes, with the intervention of the os orbiculare, and sending backward its short crus in the direction of the mastoid cells: the *stapes*—placed so nearly horizontally, that in looking upon it, the space between its crura is visible—attached externally, by its head, to the os orbiculare and incus, internally by its base to the fenestra ovalis, and giving insertion near its neck to the musculus stapedius. Next in order are shown, the vertical, oblique and horizontal semi-circular canals; the spires of the cochlea; the vestibule, intermediate between the two latter parts of the organ, communicating with each, by their respective apertures, and channeled on the roof by a groove for the lodgment of the portio dura. The Eustachian tube, the foramen caroticum, and the foramen auditorium internum are all represented. *Dupont.*

No. 33.—A model of the ear of a child, six years old, of three times the natural size. The external ear is represented with the natural integuments; the meatus auditorius externus is laid open, anteriorly: the slanting direction of the membrana tympani is well shown. An accurate conception of the ossicula, muscles, and nerves of the tympanum may be acquired from an examination of

this model. The malleus, the incus, and the stapes are well placed. The external muscle of the malleus is shown, ascending from the place of the fissura Glisseri, and winding upwards, along the side of the processus gracilis, to its attachment at the neck of the malleus. The internal muscle of the malleus or tensor tympani is well represented, arising, muscular, from the upper surface of the Eustachian tube, then running through a bony groove formed of plates which keep it apart from the tube, and finally, after winding out of a pipe-like pully, crossing the tympanum, to be inserted by its long, slender tendon into the body of the malleus. Deep in the cavity of the tympanum, the stapedius muscle may be seen. The semi-circular canals, and the cochlea; the entrances of the portio mollis and portio dura into the meatus auditorius internus; the course of the portio dura over the vestibule; its subsequent course downwards, and final escape from the bone through the foramen stylo-mastoideum, are well demonstrated. The vidian nerve is represented joining the portio dura over the vestibule, and at a more remote point crossing the membrana tympani, running between the malleus and incus, and descending in the direction of fissura Glisseri, through which it leaves the cranium. A branch of the portio dura supplying the tensor tympani, and two other smaller branches passing, one to the tympanum, the other to the stapedius muscles, are exhibited in the preparation. The structure and position of the Eustachian tube are well shown, and a few filaments of the sympathetic nerve are made to appear running along its canal to enter the tympanum and vestibule. The internal carotid artery, and the branches and ganglion of the sympathetic which accompany it through the petrous canal, are likewise exhibited. *Schloss.*

No. 34.—A magnified model of the semi-circular canals, cochlea and vestibule, with their walls un-opened, viewed from before. A demonstration is given of the form, size, and relative positions of the canals; of the sacculated shape of the vestibule; of the distance of the fenestra ovalis from the fenestra rotunda, and of the manner in which the spires of the cochlea commence and

terminate. The passage for the portio dura, leading from the foramen auditorium internum over the vestibule, is represented. *Schloss.*

No. 35.—A preparation like the preceding—viewed from behind. In addition to the objects exhibited in the former, the cribriform plates, at the bottom of the internal auditory passage, and through which the filaments of the auditory nerve are transmitted into the cochlea, vestibule and canals, are rendered manifest. The artery which accompanies these filaments is beautifully represented. The aqueducts of the vestibule and cochlea are modelled in the wax. *Schloss.*

No. 36.—A preparation analogous to the former, with the cavities of the labyrinth laid open. There are dilatations on the canals in three places. The vestibule is constricted in the middle, making a division into two chambers, called, one, the vestibule of the cochlea, the other, the vestibule of the canals. There are five openings from the canals into that part of the vestibule named after them; and the other chamber communicates with the scala cochleæ, and foramen ovale. The lamina spiralis, making two and a half turns round the modiolus of the cochlea, divides that cavity into two compartments, one, the scala vestibuli, is shown opening into the vestibule—the other, the scala tympani, is represented as closed up at the extremity by the membrane of the foramen rotundum, which looks into the cavity of the tympanum. *Schloss.*

No. 37.—A preparation, the same as the last, with the addition of the soft structures of the labyrinth. The semi-circular canals are filled with tubular ampullæ of the same shape as the cavities in the bony canals, and like them forming three dilatations near their connection with the vestibule. The cavity of the vestibule is occupied by bag-like membranes of like delicacy of character, and demonstrably continuous with those in the semi-circular canals. The prolongation of the same ampullæ into the scalæ of the cochlea, is also well exhibited; and the representation of the

mode of distribution of the nerves and blood-vessels on all parts of the membranous labyrinth, is extremely beautiful and instructive. *Schloss.*

No. 38.—A magnified representation, in red wax, of the exterior of the osseous labyrinth of the ear of a child. The preparation, marked D. *c.* 520, was that taken as a model; and the imitation, is very perfect as the accuracy in the form, relative position, and proportions of the different parts may be relied upon. The firmness of the texture of this preparation, together with a wooden handle, with which it is provided, render it particularly useful for the purposes of public demonstration.—*Houston.*

Nos. 39 and 40.—Magnified models of the tunics and chambers of the human eye. No. 39, the anterior half of the eye, showing the external surface of the sclerotic coat, the internal surface of the retina, and, at the cut margin, the dark coloured choroid coat, interposed between these tunics; also, the ciliary processes, lens, iris, pupil, &c. No. 40, the posterior half of the eye, showing, as in the former, the remaining parts of the sclerotic coat and retina; and also, the foramen opticum, the arteria centralis retinæ, and the punctum aureum of Sœmmerring. *Schloss.*

A BRIEF LIST

OF THE

WAX PREPARATIONS,

WITH REFERENCES TO THE DESCRIPTIONS GIVEN OF THEM IN THE PRECEDING PAGES.

THE END OF VOLUME THE FIRST.